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A Review of the Pathogenesis and Pathology of Bovine Tuberculosis with special reference to practical problems

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To-day, 62 years after the discovery of the tubercle bacillus, many of the essential problems connected with tuberculosis remain unsolved. Much, but by no means all, is known about the causal organisms but very little is known about the pathogenesis of the bovine disease. Thus the site of entrance of the bacillus is uncertain as are the usual age of first infection, the spread of the disease in the bovine body and the eventual excretion of the infecting agent from the body. This lack of knowledge about the disease process is hampering considerably diagnostic methods and clinical diagnosis of the disease, and last but by no means least, it is detracting from the value of our public health work.

In the first place, a brief outline will be given of the present knowledge of the pathogenesis of tuberculosis as it occurs in the calf *in utero*, in the calf infected post-natally, in the heifer and the bullock and in the cow. This will be followed by a more detailed discussion of the disease process in such organs as the lungs, udder, kidney and uterus. Many of the opinions are not original but an endeavour has been made to review many contradictory statements and where possible, personal opinion, based on observation of many careful and complete *post-mortem* examinations, is given.

Congenital Tuberculosis

In congenital tuberculosis of the calf, it is presumed that infection occurs in the majority of cases by way of the umbilical cord and so by the foetal circulation to the liver and portal lymph nodes and there gives rise to lesions. The process may stop here but in many instances nodular lesions appear also in the spleen substance, in the lung substance, and occasionally in heart muscle along with widespread lesions in carcase lymph glands.

The characteristic lymph gland lesion is well known, and consists of enlargement of the gland with diffuse cellular infiltration and early caseation. It is not a nodular type of lesion. A characteristic *post-mortem* finding is early caseation of portal, caudal mediastinal, and bronchial lymph glands with isolated nodules in lung, liver, spleen, etc.

Post-Natal Calfhood Tuberculosis

Examination of the literature quickly shows that there is great confusion as regards the method of infection in these cases. Nieberle (1929) has done extensive morbid anatomical examination of calves at slaughter, and published an account of his conclusions which I will summarise. The site of entry of primary post-natal calfhood infection is in the majority of cases by the intestinal canal, where ulceration may or may not occur. The regional lymph glands, however, show extensive tuberculosis and the importance of the portal lymph gland as being the regional lymph gland draining the duodenum is stressed. Primary pulmonary infection is relatively uncommon but when it does occur a pulmonary focus is usually found, in addition to tuberculous change in the bronchial glands. Innes (1937) giving an account of the ideas of the Nieberle School, states that while in man and dog only a small percentage of primary infections occur in extra-pulmonary tissues, in the case of the bovine species it seems to be the unanimous opinion that alimentary infection is the more prevalent, this conclusion being based on the situation of the primary complex. White and Minett (1941) discussing the pathogenesis of tuberculosis in the calf, state that the Germans emphasise the importance in young calves of primary tuberculosis of the intestines and mesenteric lymph glands. These workers also stress the fact that the portal lymph nodes are not necessarily indicative of liver infection since the nodes also drain the duodenum and they suggest that isolated tuberculosis of these nodes in a young calf may indicate either alimentary infection from the duodenum or congenital infection by the umbilical vein. It is, however, impossible to reconcile these statements with morbid anatomical findings such as those described by Gofton (1937) who from abattoir experience states that at least 40 per cent. of all tuberculous calves not showing hepatic lymph gland lesions, show lesions confined to lungs and lung glands, or with the findings of Schulz (1937), who out of 107 cases of tuberculosis in the calf found only seven intestinal complexes. Nieberle (1937), in a later article than the one mentioned above, appears no longer to agree with his own previous findings since he now states that respiratory infection of the calf is much more frequent than alimentary and that all calves which show lesions in the liver or portal glands are examples of true congenital infection. Innes (1940) in a recent article quotes the new findings of Nieberle. The findings of Nieberle (1937) indicate strongly that the view that lesions seen in the portal lymph gland of calves over 14 days old were in the majority of cases due to post-natal intestinal infection is wrong. Since these cases constitute a large proportion (as much as 50 per cent.), of all calfhood lesions, it becomes obvious that if they are no longer classed as alimentary then the percentage incidence of this route of infection drops accordingly. This question of the routes of infection of tuberculosis in the calf has led to extensive experimental evidence being put forward to support the various theories, but Glover (1941) in a comprehensive review considers on good grounds that the problem is still a very open one.

Primary infection in the calf is frequently followed by early generalisation, and Nieberle (1929) divides this generalisation into three distinct types. These as described by Nieberle presumably refer only to congenital infections but I have seen the first type in cases where infection is undoubtedly post natal.

(1) *Protracted Generalisation.*—This is by far the most frequent form. The primary complex is present with caseous lesions in portal lymph gland and/or mesenteric glands and in addition the caudal mediastinal lymph glands frequently show similar lesions. The bronchial glands are much less extensively altered but frequently show some change. In addition to these lesions, discrete nodules, usually only in small numbers, are seen in the lungs, spleen, liver, kidneys and peripheral lymph glands.

(2) *Acute Miliary Tuberculosis.*—This type is relatively uncommon in the early post-primary generalisation period. When it does occur large numbers of small miliary tubercles are present in the organs. In the lungs the scatter of lesions is not uniform nor are the nodules equal in size.

(3) *Large Nodular Generalised Tuberculosis.*—There are a number of foci of comparatively large size scattered throughout the lung giving the appearance of a focal tuberculous pneumonia.

Calfhood tuberculosis has been discussed at some length because it is felt that several points are of considerable practical importance and also because many of the unproven viewpoints have been accepted as fact and in consequence have been circulated widely as such. It appears to be a belief that tuberculosis of the adult is merely a slow progression of lesions acquired in calfhood and in consequence the disease in the calf has assumed undue prominence. That this is not the case is very easily demonstrated in that the percentage number of calves reacting to the tuberculin test is very low in comparison to that of adult reactors. It would appear that the most important age at which infection of cattle takes place is from six months to two years and it is the route of infection in these cases which is of far greater importance. In consequence, when considering the problem of bovine tuberculosis as a whole, it is of less importance whether the route of infection in calves is alimentary or respiratory. It is most certainly very misleading to make the findings in calves representative of cattle in general as has been done more than once.

In tuberculous calves it appears to be generally agreed that in those cases where the liver and portal lymph nodes are not affected, lesions are most commonly found in the lungs and/or lung glands. No definite opinion can be given as to whether the commonly occurring portal lymph gland lesions may indicate post-natal primary intestinal tuberculosis, as well as congenital infection. In the past the role assigned to these lesions by different workers has modified their interpretation of the pathogenesis of calfhood tuberculosis.

The significance of the lung and regional lymph gland lesions as an indication of the route of infection is a further debated point in both calfhood tuberculosis and in primary pulmonary tuberculosis of the adult. The controversy centres around the theory put forward by Von Behring (1903) that these thoracic lesions are not an indication

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of respiratory infection but are of intestinal origin. Von Behring contended that the tubercle bacillus could pass through the intestinal wall and localise in the pulmonary tissues without leaving any trace of its path through the abdominal cavity. This hypothesis was later supported by Calmette and Guérin (1905 and 1906); M'Fadyean (1910) indicated in a critical review that the experimental evidence of Calmette and Guérin tended, if anything, to show that lung lesions could not occur without previous alimentary lesions. Many subsequent inconclusive experiments have been performed on this aspect of the subject. Possibly one of the most convincing arguments put forward in contesting Calmette's viewpoint is that of Blacklock (1932) who showed that the majority of intestinal complexes in children are due to bovine type bacilli while the lung complexes are due to the human type.

It can be seen that the pathogenesis of calfhood tuberculosis is very far from clear. Until a large number of complete routine *post-mortem* examinations of tuberculous calves of all ages have been carried out and further experimental work done, it is wise not to be dogmatic.

Primary Adult Bovine Tuberculosis

Attention may now be directed to the pathogenesis of tuberculosis in older animals, *e.g.*, heifers, bullocks and cows, for as pointed ou above the disease process in these animals is not a progression of the disease initiated in the calf. The majority of bovines become infected at from six months to two years, that is at a period when they are more likely to be housed and in contact with cattle with open lesions. Pathological examination of older animals shows that the primary complex is in the lungs and their associated glands in at least 60 per cent. of cases, and is not intestinal or hepatic. A characteristic finding in these cases is contemporaneous lesions in the lung and the bronchial and/or mediastinal lymph glands. Although early post-primary haematogenous dissemination giving rise to widespread organ and carcase lymph gland lesions can occur in these older animals, it does not occur so frequently as in the calf. The common method of dissemination in these cases is by enlargement of the initial lung lesion or lesions with subsequent spread by the bronchial passages. It can be seen then that the primary lung focus or foci in the older bovine directly give rise to progressive pulmonary tuberculosis. I do not agree with the concept of Innes (1940) that pulmonary tuberculosis in the majority of adult cattle is due either to exogenous or endogenous reinfection of a previously infected animal, since I believe that in many cases it arises by direct progression of the primary lung lesion or lesions whether these occur in the calf or adult. Further dissemination of the lung lesions occurs by coughing up of tuberculous débris and this may give rise to a tuberculous tracheitis and/or laryngitis. The most frequent secondary lesions, however, are those of caseous lymphadenitis of the mesenteric lymph glands which arise from the swallowing of this coughed up material. Tuberculous ulceration of the bowel also arises in a similar way but is not frequent and usually occurs only in the end stages of the pulmonary disease when the size of the infecting dose is severe.

Tuberculous pleurisy is a common lesion in the bovine and in many cases this lesion arises early after primary lung infection by direct lymphatic drainage from the lesion to the pleura with subsequent direct spread over the pleura. In other cases, however, there is little doubt that the pleura becomes infected directly by haematogenous seeding. Tuberculous pleurisy in the bovine, unlike that in the human subject, does not arise by direct rupture of a lung or lymph gland lesion.

Tuberculous peritonitis is not nearly so frequent as tuberculous pleurisy and occurs at two quite different stages in the disease. It may arise during the early post-primary dissemination of calfhood when the visible peritonitis is generally confined to those parts of the peritoneum in contact with the liver (Gofton, 1937). More often, however, the peritonitis appears late in the disease process and in these cases it is frequently widespread, affecting both visceral and parietal layers of peritoneum, the left flank region commonly being the most affected area. The lesions are diffuse, and gelatinous. How the peritonitis originates is not clear although in many cases I feel sure that it starts directly from a very heavy bowel infection, which in turn is due to massive breakdown of lung lesions. Directly associated with this peritonitis is infection of the Fallopian tubes, usually followed by tuberculous metritis. Tuberculous mastitis is also associated with this late stage of the disease and it is controversial whether infection of the udder is blood borne, retrograde lymphatic extension from peritoneal lesions, or directly from the teat. These points will be discussed more fully later.

In addition to these primary lung infections there are also in the adult bovine a considerable number of cases where lymph gland changes are only seen in the retropharyngeal lymph glands. These glands drain both respiratory and alimentary areas so that it is uncertain by which of these routes infection enters. In a few cases, dissemination from these lesions does occur, both by the blood stream and by efferent lymphatics to the thorax. Although the route of infection of the retropharyngeal glands is not clear, the fact that retropharyngeal gland lesions are much more frequently associated with lung and lung gland lesions than with mesenteric gland lesions, might indicate that the majority of the lesions are due to inhalation infection.

The salient features of the disease process in the more important organs of the body, are briefly as follows:—

Lungs.—In the thoracic cavity the majority of primary complexes are complete, lesions of like age being found in the lungs and the associated lymph glands. The localisation of the tuberculous lesions in the regional lymph glands is a very accurate indication of the portion of lung involved providing it is realised that the regional glands are few in number and in consequence drain comparatively large areas of lung and that the lung tissue is drained by anastomosing superficial and deep systems of lymph channels. According to Baum (1912) the deep lymphatics of all lobes and the superficial lymphatics of the cranial lobes drain to the hilar glands while the superficial lymphatics of the two large diaphragmatic lobes drain not to the hilar glands but chiefly to the caudal mediastinal lymph gland. Thus lesions in the diaphragmatic lobes can give rise to tuberculous change in both hilar and mediastinal glands. A further peculiarity in the bovine lung is that the right bronchial gland (hilar gland) is frequently absent, in which case the lymphatics of the caudal part of the right lung drain into the caudal and middle mediastinal lymph glands and also into the *left* bronchial gland. The initial lesion in the older bovine is situated in any one of the lung lobes and consists of a limited area of productive broncho-pneumonia which in turn gives rise to lesions in the regional lymph glands. In a comparatively small number of cases the primary focus in the lung may heal by fibrosis, calcification and ossification. Much more frequently, however, this primary focus begins to caseate and spread within the neighbouring bronchial passages to give progressive pulmonary tuberculosis. The morbid anatomical picture of progressive lung tuberculosis in the adult bovine is very varied, but fundamentally the majority of lesions are similar, bronchogenic spread causing a gradual destruction of the lungs by caseation and liquefaction. The varying pictures seen in the tuberculous bovine lung do not depend upon a different method of infection but upon the size of the infecting dose, the degree of allergy and the immunity of the infected animal. Thus the massive formation of hard white hyaline fibrous tissue surrounding caseous bronchi, the varying sized groups of caseous nodules each of which occupies a lung lobule, the areas of caseous acinar lesions and the many forms of cavitation which occur in the bovine lung are all similar in that they represent variations of broncho-pneumonia. It must be remembered, however, when assessing the significance of lung lesions that primary infection may give rise to more than one primary focus. In this way several primary lung foci may progress to give broncho-pneumonic lesions and at the same time give rise to widespread lesions in the bronchial and mediastinal lymph glands. In addition it is certain that exogenous reinfection of the lungs frequently occurs and this also is mirrored in the regional lymph glands, for in the bovine, caseation of regional lymph glands is by no means confined to the primary complex. These post-primary reinfection lung lesions may also progress to form progressive broncho-pneumonia. The lesions described above are the main lesions seen in the lung. In addition to these, however, in a small proportion of cases small scattered haematogenous lesions can be recognised by the fact that they do not directly involve a bronchial passage. Widespread miliary tuberculosis also occurs in the lung and it is important to distinguish this from the diffuse acinar broncho-pneumonia which is by far more frequent.

Liver.—Tuberculosis of the liver usually consists of a few or many nodular encapsulated caseous lesions. In some cases, however, the lesion takes the form of a well-encapsulated abscess which is difficult to distinguish from a non-tuberculous abscess. The hepatic lymph gland in a large number of cases shows tuberculous caseous lesions without any lesion being present in the liver substance and again when the liver is definitely tuberculous the glands may show no lesions. The route of infection of the liver is complex in that the liver and hepatic lymph glands can be and frequently are infected in the following ways: (1) directly from the umbilical vein in congenital tuberculosis; (2) from primary intestinal tuberculosis; (3) from early or late post-primary haematogenous dissemination; (4) from secondary infection of the bowel from swallowed tuberculous sputum. This variety of routes of involvement of the liver and hepatic glands makes these lesions unreliable for the evaluation of the pathogenesis of bovine tuberculosis.

Kidney.—In the bovine, the kidney not infrequently shows lesions of tuberculosis. Two main types can be recognised. (1) A few encapsulated caseous nodules and (2) large destructive caseating lesions. The route of infection of the kidney is undoubtedly haematogenous in the vast majority of cases.

Uterus.—Infection of this organ takes place in two ways, either

from the blood stream during haematogenous dissemination of a primary lesion or in the late stages of the disease from descending infection of the Fallopian tubes from a tuberculous peritonitis. The uterus infected from the blood stream shows a characteristic nodular lesion situated in the substance of the cotyledons; these lesions may progress to form a diffuse caséous metritis. When the uterus is infected from the peritoneum the Fallopian tubes are infected first, followed by early lesions of the uterus which appear in the form of small pin-head yellow spots over all parts of the mucous membrane. These progress to form numerous caseous nodules, which later ulcerate.

Udder.—Udder tuberculosis may be divided into several types (Nieberle, 1930; Stamp, 1943).

Type 1: *Acute Caseating.*—Here there is extensive destruction of lobular tissue with large areas of haemorrhagic necrosis. Softening may occur with the formation of liquefied caseous material. Calcification may be massive or absent.

Type 2: *Chronic Nodular.*—The cut surface of the udder shows the presence of nodules, small in size (2 to 10 mm.) and frequently not very numerous. The nodules may be caseous and calcified, yellow and caseous but not calcified, or tough and fibrous.

Type 3: *Chronic Diffuse Granulomatous.*—The cut surface of the udder, instead of having the usual flaccid structure, is greatly exaggerated so that the lobules project firmly from the surrounding interlobular connective tissue. The surface is dry and not milky as the marked lobulation might suggest.

Type 4: *Diffuse Tuberculous Galactophoritis.*—Only the duct systems of the udder show tuberculous change.

In all four types of tuberculous mastitis the supramammary lymph glands may or may not show naked-eye lesions of tuberculosis. The lymph glands can be large, swollen and juicy and very similar to the lymph glands associated with an active non-tuberculous mastitis. A very important feature in all types of tuberculous mastitis, whether chronic or more active, is that there is an extensive tuberculosis of the duct system. As regards the route of infection of the udder, there is little doubt that the chronic nodular forms and the acute caseating form are haematogenous in origin. The route of infection of the granulomatous type has been the centre of much controversy. M'Fadyean maintained that the udder in these cases was infected by retrograde spread along lymphatics from a tuberculous peritoneum. For several reasons I do not consider that this is likely. In the first place the peritoneum does not always show concomitant lesions and secondly one would expect the course of the infection to take a very definite pathway following the main lymphatics, which is not the case. It is possible that the udder in these cases is infected from the blood stream during the late stages of the pulmonary disease and that the udder, peritoneum and uterus all become infected about the same period. It must be admitted, however, that the question is still open and needs further investigation. The possibility of teat contamination and direct infection by this method must be considered since primary udder tuberculosis gives very similar lesions.

Some very important practical aspects arise from this brief discussion of the pathogenesis of tuberculosis in the bovine. That haematogenous disseminations do occur frequently in the bovine must be stressed since the idea that tuberculosis only spreads by the lymphatics appears to be a commonly held opinion. It is certain that organs such as liver, kidney, spleen and udder along with carcase lymph glands and serous membranes are infected from the blood stream. This post-primary haematogenous spread is important for several reasons. Firstly, the udder can and does become infected both early and late in the disease; this will be discussed later. Secondly, this haematogenous spread is important from the meat inspection viewpoint, in that all carcase lymph glands should be inspected in every case of tuberculosis. The great importance placed on the involvement of the hepatic lymph gland in meat inspection shows a lack of appreciation of the pathogenesis of tuberculosis since not only does it allow haematogenous lesions to be missed, but in many cases it is no criterion of blood spread. The hepatic lymph gland can be affected from the alimentary canal during the formation of the primary intestinal complex, or from intestinal infection secondary to a discharging lung lesion, neither case indicating haematogenous dissemination. Infection of the intestinal canal and its regional glands from older lung lesions is extremely common in the adult bovine and it is from this source that the majority of mesenteric lymph gland lesions and many hepatic lymph gland lesions arise. The last criticism that I will make as regards meat inspection methods is the fact that the liver abscess in many centres is never considered to be tuberculous in origin. That some are tuberculous is undoubted and since these lesions may not lead to naked-eye involvement of the hepatic gland this allows the carcase in many centres to be passed without complete examination. That these lesions may be blood borne makes further examination of the carcase the more essential.

Another aspect of tuberculosis where a knowledge of the pathology and pathogenesis of tuberculosis may be of some value is in the explanation of some of the problems which face the clinician in the so-called "no lesion cases." In the human subject the primary complex of first infection frequently heals, the only remaining evidence of infection being a fibrous tissue scar in the lung or dense fibrosis of the regional lymph glands, and yet these lesions give rise to a positive tuberculin test. It is not necessary to have viable tubercle bacilli present to give a positive tuberculin test. Such a reaction merely indicates that tuberculous infection has occurred. (Pagel, 1939) (Kayne, Pagel and O'Shaughnessy, 1939). Similar healed lesions must arise in the bovine. In America where this "no lesion problem" is now of importance it has been stressed that histological examination of all questionable lesions is of great help in determining the true nature of a doubtful lesion and that very careful *post-mortem* examination should be carried out before assessing any case. This careful *post-mortem* examination involves many hours of work and requires the building up of a good technique as well as proper facilities for carrying out the work. I believe that all trials carried out for testing of the efficacy of any tuberculin must be controlled by complete *post-mortem* examination both gross and microscopic. Bacteriological examination alone is not sufficient.

Some of the most important practical aspects of tuberculosis arise, however, in connection with udder infection since it is from this condition that milk usually becomes contaminated. Before discussing the actual infection of the udder, it is necessary to discuss the importance of bovine tuberculosis in man. It should be realised that the bovine tubercle bacillus plays only a very minor part in the disease of the adult human, which is the form of tuberculosis generally known. In children, however, this type of bacillus plays a very important role. It is not generally appreciated that in childhood, especially early childhood, the tubercle bacillus is a deadly and frequently killing organism which gives rise to a form of tuberculosis very different from the chronic phthisis of the adult. Koch (1901) stated that in his opinion the human and bovine types of bacillus were distinct varieties and that the latter was of little importance as regards infection in man. M'Fadyean (1901) disagreed and contested the truth of Koch's statement. To-day Koch is known to have been wrong, but even so there are still people who consider that the bovine bacillus does little harm and that these bacilli in milk are in fact helpful towards providing an immunity against the human variety. This idea cannot be too strongly censured for there is much evidence to show that it is untrue and no evidence of any kind to show that it is in any way correct. Several very important facts must be taken into consideration in assessing the evidence. According to Blacklock (1932) the incidence of all kinds of tuberculosis in children is very low in the first three months of life; after this there is a progressive increase throughout the second year up to its maximum incidence in the two to three-year group; thereafter there is a gradual decrease. These figures are based on both *post-mortem* findings and tuberculin testing. The work of Blacklock on the incidence of childhood tuberculosis in the West of Scotland has thrown very useful light upon the comparative frequency of bovine and human types in childhood and upon the prognostic outlook in these cases. He found that in the first two years of life, nearly all the children in whom tuberculous lesions were found, died as a result of them, while from the fourth to the 13th year the tuberculous disease was the cause of death in 75 per cent. of infected children. Blacklock's mortality figures are very high but they have been confirmed by other workers. Of the deaths due to tuberculosis in the first two years of life, 72·7 per cent. were due to the human type of bacillus and 27·3 per cent. were due to the bovine bacillus. It is noteworthy that during the second year of life, that is at the time when children are consuming large amounts of cows' milk, the highest mortality figure for bovine type infection of man is reached, *i.e.*, 37·3 per cent. of all deaths due to tuberculosis. About 2,000 children under the age of five die from tuberculosis each year in England and Wales and by far the highest number of deaths occur in the one- to two-year group. It can be estimated from representative data that at least 600 children in England and Wales die yearly as a result of tuberculosis of bovine type. It is generally admitted, however, that the human type of bacillus is more pathogenic to the human than is the bovine bacillus but this is merely a relative comparison between two organisms of great virulence. The bovine baccilus causing lesions in young children kills in a high proportion of cases: the human type bacillus is almost invariably fatal. Pagel (1939) (Kayne, Pagel and O'Shaughnessy, 1939) states that there are differences in susceptibility at different ages, and that in infants and young children primary infection is very often fatal, taking an acute and malignant course, whereas at a later age primary infection frequently becomes arrested. Unfortunately, it is at the most susceptible age that most milk is drunk; it is paradoxical that the exponents of the tuberculous milk immunisation theory should want young children to ingest bovine tubercle bacilli of unknown dosage at the very age when the

child is most susceptible. It is known that bovine tubercle bacilli in later childhood frequently cause lesions of the cervical glands which are believed by a few to prevent the onset of progressive pulmonary tuberculosis in later life, but this is equally true of cervical adenitis of human origin and of the healed Ghon focus of the lungs, and yet no one has suggested that viable and virulent human tubercle bacilli should be used as an immunising agent. An unproven argument often used to support the theory of tuberculous milk immunisation, is the idea that small numbers of bovine tubercle bacilli ingested in milk give an immunity to the consumer without causing lesions of any kind. If the incidence of progressive tuberculosis of the human is lowered by the ingestion of bovine tubercle bacilli in milk by our children, then surely it would be much better, as Savage (1929) suggests, for bovine tubercle bacilli to be administered in an accurate and measured dose at a chosen period during childhood. To suggest, with this practicable possibility available, that it is beneficial to allow the sale of tuberculous milk with the proven certainty that many children will be killed and many more crippled for life, merely with the hope that others will gain some immunity to adult pulmonary tuberculosis, is criminal.

The importance of tubercle bacilli in milk has just been stressed. Until tubercle-free herds are universally established in this country, it is essential at least to control and if possible eradicate udder tuberculosis. The main morbid anatomical features of tuberculous mastitis have been described and from them several important points arise for consideration. In the first place, manual examination of the udder is a very unreliable method of diagnosis since in the chronic nodular forms of the disease the lesions are too small to palpate. The acute caseating and the chronic granulomatous types are said to present little difficulty in manual diagnosis. In the late stages of the condition and to the competent clinician doing a very careful manual examination these forms may present little difficulty. In the earlier stages of these types of udder tuberculosis, however, this method of diagnosis is of very little use. The correctness of this is confirmed by the incidence of tubercle bacilli in milk being in no way reduced by reason of the milk being accredited (personal communication). This is also clearly shown by the time lag, often of several months, which frequently occurs between bulk sample diagnosis of the presence of tubercle bacilli and the finding of the offending udder and even then the eventual diagnosis is frequently not by manual examination. It is therefore very evident that for longer or shorter periods tubercle bacilli must be present in milk, often in large numbers since, unfortunately, tuberculosis does not prevent lactation except in the later stages. There are further points which arise in connection with udder tuberculosis. The involvement of the supramammary lymph glands gives no indication as to the involvement of the udder (Stamp, 1943) so that they are of no help in diagnosis. The udder may be extensively involved with tuberculosis while the lymph glands show no specific lesions. On the other hand, the supramammary lymph glands may show caseous lesions without involvement of the udder. In this latter case, there is also usually a widespread involvement of carcase lymph glands, so that it is presumed that both the carcase and supramammary lymph glands become infected at the same early post-primary period from the blood stream. In all types of udder tuberculosis there is an extensive involvement of the duct system early in the disease, so that all cases of udder tuberculosis are "open" lesions. As regards the method of infection of the udder, it is considered that this is in many cases by the blood stream, either from early post-primary dissemination or from late dissemination. Lately, however, it has become increasingly obvious that udder infection may also occur by the teat. This method of infection has been previously dismissed rather summarily but that it plays some part in the spread of tuberculosis cannot now be denied. (McFarlane, Stamp, Watts and Garside—*Vet. Rec.* **56.** 369–371.)

A further important practical aspect of bovine tuberculosis arises in connection with the diagnosis of open lung cases of tuberculosis. At the present time it is necessary to slaughter cattle only when they have reached an advanced stage in the tuberculous disease process—when they have a chronic cough and show definite clinical signs of tuberculosis or when they show tuberculous emaciation. These animals are usually slaughtered when tubercle bacilli are demonstrated in the sputum. It must be emphasised that this is not an attempt to control tuberculosis in our herds and was never intended as such, since it was introduced as a public health measure, as a complement to the Milk and Dairies Act. It is unfortunate that this is not more widely recognised because the very idea of controlling the spread of tuberculosis by this method is absurd. In the first place it must be recognised that tuberculosis in the bovine animal is in the main contracted by inspiring droplet infection from neighbouring infected animals. In the second place it must be recognised that from the nature of the condition the vast majority of tuberculous cattle are excreting tubercle bacilli directly from the lung or in the faeces since pulmonary tuberculosis in its commonest form is an "open" lesion almost from its inception. Thus the majority of infected animals are a source of danger from the start of the disease process. The idea that pulmonary tuberculosis can be divided into "open" and "closed" cases is not borne out by *post-mortem* examination. It is found that in the later stages of the pulmonary disease old chronic broncho-pneumonic lesions frequently flare up and give rise to a diffuse and widespread caseating broncho-pneumonia by extension of the disease within the bronchial passages and in consequence, these animals constantly excrete large numbers of organisms from the lungs. It is these cases which are frequently condemned under the Tuberculosis Order. Nevertheless, the majority of tuberculous cattle, although not so conspicuous, are also excreting tubercle bacilli either constantly or intermittently from their lungs. Careful examination of a large number of lung lesions shows that the early lesions frequently extend quickly and caseate into bronchi and this is followed by aspiration and swallowing of tuberculous débris with subsequent involvement of the mesenteric lymph glands and eventual excretion in the faeces. It is from this source that the mesenteric lymph glands are often infected and not from primary infection. It has been widely quoted in veterinary literature that cavitation of the lung does not occur in the bovine. Examination of a large number of tuberculous lungs shows this statement to be incorrect. Cavitation of a caseous primary focus is common, while cavitation of the chronic caseous broncho-pneumonic lesions is also frequently seen. The formation of these latter cavities is slow, with a gradual exuding of caseous débris into a bronchus. Bronchiectasis is also a frequent finding in a chronic tuberculous lung.

Tuberculous ulceration of the intestine may occur during the primary intestinal infection period, but this type of ulcer heals and leaves no recognisable features. The more important type of tuberculous ulceration is the chronic form which occurs late in the disease process due to infection of the bowel from progressing lung lesions. Although the mesenteric glands so frequently show extensive lesions of tuberculosis, the intestinal ulcer is relatively uncommon and only appears to occur when infection of the bowel is very massive. It would seem that in the majority of mesenteric gland lesions, the tubercle bacilli pass through the bowel mucosa without causing any permanent recognisable lesion. Small yellow or green foci are frequently seen in the lymphoid tissue of the intestine but they are in our experience due to helminth infection and not to tubercle bacilli.

This paper is a brief summary of a very extensive problem and it is concerned only with the more important practical and controversial aspects.

Summary

(1) The pathogenesis of calfhood and adult tuberculosis is reviewed.

(2) The morbid anatomy and pathogenesis of organ tuberculosis with special reference to the lungs, liver, kidney, uterus and udder is given.

(3) Some practical problems of bovine tuberculosis are discussed, mainly in connection with meat inspection.

(4) The importance of bovine type tuberculosis of man is emphasised and the importance of elimination of tuberculous mastitis is stressed.

(5) Some of the difficulties in preventing the spread of tuberculosis in a herd by elimination of "open" cases are given.

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The Activities of the Royal Army Veterinary Corps in the Mediterranean Theatre

Major A. V. FRANKLIN, T.D., R.A.V.C.

Consequent upon the progressive mechanisation of the Forces the outbreak of the present war found the Corps reduced to a shadow of its former self. In order to present its activities in a coherent form within the limits of a brief article it is proposed to trace its history from the early days of mobilisation to the present time.

The formation of the Cavalry Division for service in Palestine was followed by an immediate though limited resurrection and several veterinary units were organised and trained for employment overseas to attend the animals of that division. These included a veterinary hospital, a convalescent horse depot, a veterinary evacuating station, three cavalry mobile veterinary sections as well as a base depot of veterinary stores. At the outbreak of war there were already two regular cavalry regiments stationed in Palestine with a mobile veterinary section. These regiments, the Royal Dragoons and the Royal Scots Greys, had been engaged upon operations in connection with internal troubles in that country which were terminated shortly before the commencement of hostilities. In addition to these formations certain Indian and Cypriot mule pack transport companies were operating in France for whom veterinary services were also provided. Such was the scope of the R.A.V.C. overseas in the early days and, generally speaking, these conditions prevailed throughout the year 1940. In the meantime fullest advantage was taken to train all ranks to be ready in the event of heavier calls being made upon them so that they could form a sturdy framework within which further expansion might be based. This later proved to be sound planning.

The year 1941 marked a memorable year in the history of the R.A.V.C. for it was then that the duties previously performed by the Army Remount Service were transferred to the Corps. This meant that not only were we charged with the care of the sick and injured but were also responsible for the purchase, training and maintenance of all reinforcements. Subsequent events justified the wisdom of this policy and the unity of control which resulted has been attended by a marked increase of efficiency and economy. Veterinary officers were thus in command of remount depots and could act as presidents of purchasing committees. It was a source of great encouragement to the Corps that the authorities should confirm their confidence in it by this amalgamation and one which gave satisfaction to the profession as a whole. The Corps was determined to see to it that this gesture of confidence should not be misplaced and took over its new duties full of enthusiasm for whatever the future might have in store.

Fresh scope was soon forthcoming in the shape of three campaigns —Eritrea, Greece and Syria—in all of which the Corps played an active part. Of these, the fighting in Eritrea was perhaps the most spectacular as far as the pack transport companies were concerned and it has since been acknowledged by high authority that the aid rendered by these units operating in the most difficult country imaginable was invaluable. Here R.A.V.C. units, and officers in veterinary charge of pack transport companies took a prominent part and it was largely through their efforts that animal wastage upon more than one critical occasion was kept at a low level.

For Greece, a veterinary hospital, a mobile section and a field remount depot were despatched to support the mule companies ordered thence from the Middle East. Useful work was done while the fighting lasted but when the time came to evacuate, a not inconsiderable proportion of our officers and other ranks were unable to get away and unfortunately were taken prisoner. On one occasion heavy casualties were suffered from the air by mules of the remount depot which had been ordered forward to the assistance of the troops in the line and it was only the resource of the officer and men in charge that prevented far more serious losses. In the meantime a mobile section was stationed at Alexandria in veterinary charge of the Polish Carpathian Brigade, consisting of a regiment of Uhlans as well as some artillery and other arms for which large numbers of mules were employed. This section was given the task at the time of Wavell's great drive of salvaging hundreds of mules left behind in the desert by the Italians and conducting them back to railhead. The condition of many of these animals, running at large in the desert, was deplorable and numbers were found *in extremis*, having been without food or water for days. It was remarkable to observe the way they rapidly picked up with proper care and attention.

The fighting in Syria saw cavalry operating as such in the form of several regiments of yeomanry belonging to the Cavalry Division. Apart from their own regimental veterinary officers, two mobile veterinary sections served them and they did useful work in evacuating casualties from forward areas and maintaining the supply of reinforcements.

The campaign, although sharp, was of short duration and at its conclusion the R.A.V.C. was given its first real opportunity of showing its paces in the remount sphere. The French Army in Syria was not highly mechanised and numbered upon its establishment many thousands of animals of all kinds. There were barbs from regiments of Spahis; there were light and heavy draught horses, and mules of various types. These were mainly concentrated in remount establishments in the Lebanon; at Beirut, Damascus, Baalbek and elsewhere. The task of taking over the animals from the Vichy French was undertaken by a Commission of Control Committee presided over by a senior R.A.V.C. officer. Later on, according to requirements, the animals were allocated between the Fighting French and the British Forces. This involved an immense amount of work such as classification, examination for disease, mallein testing, branding, shoeing and so forth, as well as the sorting out of masses of equipment, harness, saddlery, vehicles and veterinary stores, much of which proved to be very valuable when further horse transport units were formed. Most of the draught horses other than those turned over to the Fighting French were issued through our remount depots to the British companies and splendid animals many of them were. Of the barbs, many were issued to pack transport units as riders. In a large proportion of cases the horses and, to a lesser degree the mules, were originally found in a pitiable condition, their attendants having "walked out on them," leaving them tied up without food or water. The mules, which included a large proportion of excellent type, were later issued to pack transport companies. At last the task was completed and thousands of animals had been taken over, conditioned in remount depots and re-issued as required to units forming over a very wide area in Syria, Palestine and Egypt.

In the meantime the yeomanry and regular regiments of cavalry had either been mechanised or were destined to become so in the near future and their horses were handed in to our remount depots. In order to make the best use of these animals it was decided that all those of a suitable type and likely to prove useful for draught purposes should be trained as such for distribution to existing horse transport companies and to assist in the formation of others in conjunction with the newly acquired French animals. Men well equipped for this duty were forthcoming at the remount depots and very soon ex-cavalry troop horses were being issued, fully trained for their new but equally useful though more humble duties. In the first instance, these horse transport companies were formed to save mechanical transport, petrol and tyres, at a time when anything on four wheels driven by petrol was at a premium. They were, as a rule, disposed of by sections, of which there were four or more to a company, at depots and establishments where transport was constantly required to undertake short journeys in which speed was unimportant. It was soon found that the load figures indicating material hauled over a comparatively short period by one of these sections reached large proportions. It can fairly be claimed that the R.A.V.C. was the progenitor of these invaluable units.

The year 1942 marked the advent of further important duties being assigned to the Corps: meat inspection and the administration of livestock depots. The time had come for the inspection of fresh meat now supplied to the troops (all of which was purchased through local sources) to be established upon a sound and scientific basis and the R.A.V.C. was asked to organise a programme of livestock inspection both *ante-* and *post-mortem*. This was done and before long (throughout the Middle East) an organisation was devised whereby a high standard of inspection was initiated and maintained. Responsible N.C.O.s were trained to act as assistant inspectors of meat; they carried out general inspection duties in the slaughterhouses and were able to observe any abnormalities encountered pending a decision regarding disposal by the veterinary officer in charge. It soon became evident that the hygienic conditions prevailing in many local abattoirs left much to be desired; indeed, in certain of the smaller slaughterhouses conditions obtained which, according to western standards, were distasteful in the extreme both as regards the buildings themselves and the methods employed by the persons engaged in them. Consequently, upon the advice of our administrative officers model abattoirs were built, equipped with ample lairage accommodation, and sited with a view to adequate rail and road facilities for the rapid distribution of meat by the supply services. It is well known that in the Middle East certain parasitic conditions communicable to man are widely prevalent in bovines and the Corps had the satisfaction of eliminating the danger from this quarter, while although the work was not spectacular it was certainly not behindhand in relative importance. Later the actual selection of all livestock for slaughter for Army consumption was delegated to use and consequently the quality of the stock produced by the contractors rose at once by the simple expedient of our declining to accept anything which did not comply with a certain standard. This caused a temporary shortage of fresh meat until the contractors realised it was useless offering for selection and transportation, frequently over long distances, inferior stock which they soon learnt would be rejected at the *ante-mortem* examination. At the same time, owing to prevailing local conditions whereby good grazing and a plentiful

supply of foodstuffs were difficult to secure, it was often beyond the powers of producers to offer stock of the required quality. It was decided therefore to establish our own livestock depots, run by military personnel, to supplement supplies from civilian sources. The first of these depots was formed in Syria and so successful was the venture and so excellent the quality of its products, that it was rapidly succeeded by other depots throughout the Middle East, not only for the fattening of cattle, sheep and goats but also for the breeding and rearing of pigs. An interesting side-line run in conjunction with the pig farms were the rabbitries, organised in order to ensure a supply of white meat for patients in military hospitals on special diet. To command these depots officers were available familiar with the various problems associated with the feeding and rearing of farm animals, assisted by R.A.V.C. personnel with an agricultural background in civil life and, in their hands, the project was an outstanding success. The idea, in so far as cattle were concerned, was to purchase and retain them for a period of about ten weeks and by a programme of intensive and scientific feeding to increase their weight to a maximum within a minimum of time. One depot alone, carrying a total stock of 1,500, was thus able to produce a weekly turnover of 150 beasts for issue. A careful system of grading was introduced whereby cattle were graded according to breed and condition, and distributed as such in separate kraals so that beasts commencing in the lowest or an intermediate grade upon purchase gradually worked their way up to the "fit for issue" grade. It is interesting to record that the veterinary officer commanding this particular depot observes that in Syria immense annual losses occur as a result of parasitic disease in civilian-owned sheep and goats, and that in one winter alone, aggravated by severe weather, no less than 1,000,000 head succumbed, representing a loss of £3,000,000 sterling or one-quarter of the annual budget of the country.

The question of the employment of dogs on an extensive scale, both for guard duties and in active operations, was now being considered. In the Middle East, it was found that properly trained animals were valuable for guarding installations such as supply depots, especially during the hours of darkness, against the pilfering proclivities of the native inhabitants while special problems associated with the care of dogs in a sub-tropical climate presented themselves for consideration. Dogs are now engaged upon more active duties in a theatre of war nearer home, in a sphere which, for security reasons, cannot be discussed at this juncture but which will provide interesting reading at a later date. Suffice it to say, however, that the R.A.V.C. is charged with the provision of all canine recruits for this work under a specially selected staff whose experience in civil life with these animals has proved most helpful.

This brings us to the campaign in Italy where, for the first occasion in this war, the Corps was privileged to play an active and important part in operations upon a large scale, an opportunity eagerly awaited by all ranks but which, at one time, seemed unlikely to mature. It was clear that, owing to the extremely difficult nature of the country over which operations were being conducted, mule transport upon a basis never imagined by some authorities in the present war in Europe would be urgently required and it became the responsibility of the R.A.V.C. to meet these requirements. Purchasing commissions were appointed, functioning in many lands over extensive areas to produce animals of the right type and to concentrate them at the right places for transport by land and by sea to our remount depots, for classification, conditioning, training, shoeing and finally for delivery to the units themselves. This work not only called for an intimate knowledge on the remount side regarding suitability and type, but also for the highest degree of vigilance on the part of purchasing officers to ensure that ever-present scourges such as glanders, epizoötic lymphangitis and mange should not be introduced into the distributing depots. If further evidence to justify the amalgamation of the veterinary and remount services was required it was now forthcoming.

These activities necessitated a rapid expansion of our officer strength not only to furnish a body of officers for the pack transport companies themselves, each of which carried a veterinary officer on its establishment, but also to supply officers for the many freshly formed technical units to service them. These units included remount depots, veterinary hospitals, mobile veterinary sections, base and advanced depots of veterinary stores, a veterinary laboratory and veterinary and remount conducting sections. These last-named units were a comparatively recent innovation and were designed not only to evacuate casualties from the line but also to sustain forward units with reinforcements. For this purpose they correspond roughly as regards strength to the old veterinary evacuating stations of the last war but with this difference—they are highly mobile and are generously equipped with motor transport modified in such a way as to enable them to transport rapidly large numbers of animals. In practice they have proved an immense success and constitute one of our most coveted commands for a young, keen and energetic officer.

Space does not warrant, neither is the time yet opportune to dwell at length upon the services ungrudgingly given by the gallant personnel and animals of the pack transport companies, but some day, let us hope, the story of their deeds will be written for all to read and that honour will be done to them. It was our duty to fill their gaps with reinforcements and to attend their casualties, both from a humane and from a military point of view, so that they could, once again, take their place in the line where they were so desperately needed for their work of carrying food, stores and ammunition. Much devolved upon their efficiency and this in turn depended in a measure upon the R.A.V.C.

So, from the modest beginning with the old Cavalry Division some attempt has been made to trace the expansion of the Corps and to describe something of its work up to the present time. The officers who embarked with the Cavalry Division and the few veterinary units in the early days of the war have thus formed a nucleus around which our present organisation in the Middle East has been moulded. These officers are now mostly holding administrative posts or commanding important units. The majority of the senior N.C.O.s and some of the junior ones also, have been promoted to warrant rank or have been awarded commissions either in other services or as quartermasters in the Corps. Most of our officers now consist of those holding emergency commissions many of whom have already completed several years' service and have attained senior rank.

It is easy to deal with the past and present but difficult to predict the future. There seems no reason to doubt however that, as the war continues, demands upon the services of the Corps will tend to increase and that fresh duties will devolve upon it. As to the nature of these responsibilities it would, at the moment, be premature to speculate; suffice it to say, however, that the R.A.V.C. will be found ready and prepared to shoulder them.

In conclusion, it is fitting that we should acknowledge a debt of gratitude to certain distinguished members of the profession who, from time to time, have placed their experience and the facilities they command at our disposal in helping to solve many problems which have presented themselves. These gentlemen include Dr. S. C. J. Bennett, of the Sudan Veterinary Service; Mr. G. F. Simmons, Chief Veterinary Officer, Palestine, his research officer Mr. H. R. Binns and the staff of the Government Research Institute, Tel Aviv; Professor Zaki Morcos of the School of Veterinary Medicine, Cairo; Dr. F. C. Minett, Director of the Imperial Veterinary Research Institute, Muktesar, and his staff, and the Principal of the American University, Beirut.

GUY SUTTON MEMORIAL FUND

	£	s.	d.
Further Donation—Mrs. Guy Sutton ...	10	10	6
Previously acknowledged	1,239	9	6
	£1,250	0	0

The fund is now closed.

* * * * *

Weekly Wisdom

I carried buckets where taps might have been laid on, I lifted gates which could have been properly hung, I slopped through holes which a load of stones could have filled, I wasted hay under the feet of stock which would have fed better from racks, I walked miles the smallest degree of planning could have reduced to yards, I wasted with a hurricane lamp hours which an electric light switch might have saved.—Frances Donaldson in *The Countryman*.

The acquisition, preparation, training and shipment of large numbers of animals, their provisioning, equipping and the maintenance of their good health, as well as their care during sickness or injury, is a tremendous task.

The corps must have been of absolutely vital importance in the general scheme of operations, and yet how little and how rarely is it ever mentioned or recognised in public war reports. The "Cinderella of the professions" has been our legend for many years, and one looks in vain for a reversal of this state. A publicity campaign would appear to be needed, first of all to acquaint the general public that there exists such a body as the Royal Army Veterinary Corps, and secondly, to give its many achievements—humane and practical—their due meed of importance in the country's estimation. We, at least, will follow the evolution and activities of the corps with the greatest interest and sympathy.

THE VETERINARY RECORD

November 18th, 1944

THE ROYAL ARMY VETERINARY CORPS

WE publish to-day, and welcome, the timely article by Major Franklin upon the activities of the Royal Army Veterinary Corps. Too little has been heard of the Corps throughout this campaign and we are gratified to learn, through our contributor, of the great and important part it is playing towards the conquest of our enemies.

Its expansion appears to have depended initially upon the mobilisation of a Cavalry Division, the need for, and value of which was quickly appreciated in the Mediterranean theatre. Russia, too, has employed with great success huge forces of cavalry on the Eastern Front. The Germans and some other nations have always relied in great measure upon horse transport, all of which facts support the oft-reiterated belief among highly placed military leaders that in no war of any magnitude could the employment of the horse, mule or camel (and sometimes the ox) be dispensed with. This must have been especially true in mountainous or in boggy areas. And so we find the animal again comes into its own and, with it, the R.A.V.C.

The general public would be amazed to know of the valuable and multifarious duties performed by the veterinary officer in this war. Indeed, we feel that it is a pity Major Franklin's article is not receiving much wider publication. The anger and indignation of the British public would certainly be at once aroused could it read the description of how the enemy left his animals to die of thirst and hunger in the desert, without even untethering them. Fortunately their sufferings were relieved by R.A.V.C. personnel, who found them in a pitiable condition.

One is struck, in reading the report, by the great diversity of duties a modern R.A.V.C. officer is called upon to discharge. They seem to range from the inspection of meat, the care of camels, mules, horses and goats, and the training of dogs, down to the rearing of rabbits to provide food for men sick in hospital, to mention but a few. Thus it is a source of congratulation that the young graduate, by virtue of his sound basic training, should have been able to overcome all difficulty and acquit himself so well in the field—no mean attainment!

It is certain that a great number of the older men of senior rank who served through the last war thought that their intimate knowledge of army veterinary affairs, and their wide practical experience, would be quite indispensable. They were, however, disillusioned and saddened to find their services were not needed in this war. This was not because their contribution to the common weal would not have been invaluable, but was connected largely with the fact that nearly all veterinary service was destined to be given in the Near, Middle or even the Far East. It needed young blood in most cases to withstand the rigours of tropical or sub-tropical climates; and so, in yet another sphere, youth was to play the chief part.

That a corps (which on the outbreak of hostilities had so diminished owing to mechanisation) should have become so suddenly, successfully, and unexpectedly expanded, reflected the greatest credit upon Brigadier Murray and his staff, who were largely responsible for its planning and organisation during the years of peace. And this notwithstanding the additional duties imposed upon it of a remount service. The corps can be congratulated upon having had an opportunity to demonstrate to the nation the wisdom of the military authorities in having abolished the old Army Remount Service as a separate entity and having vested its functions with the R.A.V.C. Quite obviously, no body of men is better trained or more able to discharge such functions than those whose lives are entirely devoted to the study of every phase of animal life. The only wonder is that the change was not effected many years earlier.

(Concluded at foot of previous column)

CLINICAL COMMUNICATION

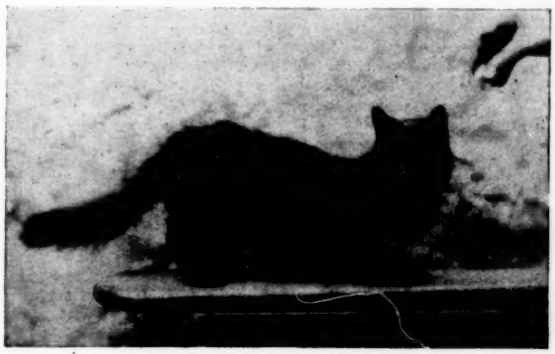
Arrested Development of the Long Bones of the Fore-limbs in a Female Cat

A Genetical Rarity

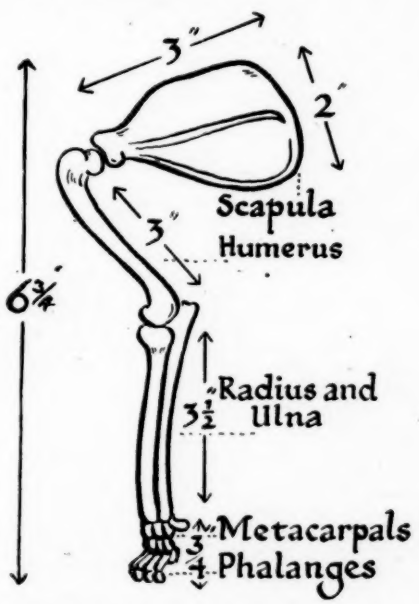
H. E. WILLIAMS-JONES, M.R.C.V.S.,
Ruthin

I am submitting this case, hoping that I shall have some information as to the prevalence and cause of this condition, an inherited character, which has shown itself in at least four litters of female cats.

The animal in question is a black female cat, 8½ years old, which has apparently had an extremely healthy life. The dam and great dam and some of the female progeny (when inbreeding has taken place) have all had this peculiar conformation.



The animal's movements are ferret like in view of its extremely short fore limbs and long hind legs, and its thoracic region stands barely 1½ in. from the ground. Otherwise it is normal in every way. The following dimensions may be of interest:—



Back 11 in. long. Tail 11 in. long.
Height from shoulder to ground 6¾ in.
Height from croup to ground 9½ in.

ABSTRACTS

[A Comparative Study of Two Biologic and Two Chemical Techniques of Pregnancy Diagnosis in the Mare. MAYER, D. T. (1944.) *Amer. J. vet. Res.* **5**. 209.]

This paper reports a study on the comparative reliability of chemical and biological tests for pregnancy diagnosis, in which the author utilised urine and blood samples from approximately 100 mares, for which complete records were available for the entire gestation period. Three techniques were applied to urine for the detection of oestrogens—a biological test using rats (similar in all essentials to the mouse test employed in Britain), and two chemical techniques, the Cuboni and an adaptation of the Kober test (phenosulphonic acid method); the gonadotropic level of the blood serum was estimated by the usual technique, using immature rats.

In this investigation, all three urine methods gave 100 per cent. correct diagnosis after the third month of gestation in 66 mares which later foaled. In mares reported as not foaling, however, the two chemical methods gave correct diagnoses on 96·4 per cent. of the samples examined whereas the biological test gave only 85·7 per cent. correct results. The author points out that a comparatively low percentage of correct diagnoses has also been repeatedly reported by other workers for mares which fail to foal. A possible explanation for these incorrect results is the occurrence of unobserved abortion or of resorption of the foetus.

The blood serum test was the least accurate of any of the four tests employed, giving only 82 per cent. correct diagnosis in both pregnant and nonpregnant mares. The reports of other workers, however, indicate an accuracy of 95 per cent. or more; the unusual inaccuracy of this method in the present investigation may have been due to the fact that, since the majority of the mares used were on the range, the possibility exists that unreported abortions occurred early in the gestation period (50 to 90 days), during which this test is applicable.

N. J. S.

* * * * *

[Salmonella Infections in Ducks: Observations on the Value of the Agglutination Test in the Eradication of Infection and Investigations on the Cycle of Infection via the Egg. GORDON, R. F., and GARSIDE, J. S. (1944.) *J. comp. Path.* **54**. 61-76.]

Owing to the possibility of "food poisoning" arising in man from the consumption of eggs from ducks affected with salmonellosis, these infections are not only important in the rearing of ducklings, but have a particular public health significance. Both these aspects are considered in this paper.

It has long been assumed that the cycle of infection in salmonellosis of ducklings resembles that which occurs in pullorum disease and that infection is transmitted through the eggs of carrier ducks. In view of this, the authors, when faced with a serious outbreak of the disease in ducks, attempted to eradicate the infection on the basis of the agglutination test. In this outbreak the losses amounted to 1,000 ducklings a day and there was a total mortality of 30 per cent. in a flock of 57,000 ducklings. The entire breeding flock was tested by the agglutination test, using two separate antigens, *viz.*, *S. enteritidis* and *S. typhi-murium*, and all reactors were removed. Although two re-tests were carried out at intervals of two to three months, these measures failed to reduce the number of carriers. Furthermore, the results of the blood tests showed that the percentage number of reactors increased with the age of the ducks. The authors therefore concluded that the failure to reduce the prevalence of reactors was due to continued reinfection of mature ducks and that infection in them was not due to the persistence of the disease contracted as ducklings.

In order to check the accuracy of the agglutination test and also to determine whether the serological results were associated with any particular change in the ovary, *post-mortem* and bacteriological examinations were made of 113 of the reacting ducks. The causal organisms were recovered from 55 of these ducks and it is interesting to note that in 45 out of the 55 birds the organisms were isolated from the ovary. In 38 cases it was the only organ affected. Although many of the ovaries appeared normal, the majority were inactive. In only five cases were the ovaries capable of transmitting infection through the egg at the time of examination, though 37 others were potential transmitters, when and if activity of the ovary returned. When the state of the ovary was correlated with the agglutination test results, it was apparent that the fluctuation in the serum titre of reacting birds was related to the activity of the ovary, A definite decrease occurs in the titre of the serum when egg-laying ceases.

A very significant part of the investigation concerned the transmission of infection through the egg. Although 2,436 eggs were used for cultural examination no evidence of the presence of salmonella infection was found in the eggs. Similar results were obtained in the breeding experiments. No losses occurred and no reactors were detected in the 84 ducklings hatched from reacting ducks.

The authors conclude by stating that their experimental findings support the view that "in salmonellosis in ducks, egg transmission, if it does occur, plays a minor role in the dissemination of infection." Furthermore, the value of routine blood testing is open to question, as the persistent reinfection of adult ducks and the fluctuation in the serum titre of reacting ducks makes it impossible to eliminate reactors.

G. D.

Questions and Answers

"Questions and Answers" will be published on alternate weeks.

The submission of questions for inclusion in this column will be welcomed. They can relate to any aspect of veterinary work and where publication of the name of the enquirer is not desired, a pseudonym should be supplied, the name and address also being given.

Answers to readers' queries represent exclusively the personal opinions of the writers, and criticism of the replies will be appreciated.

All communications should be addressed to the Editor.

Udder Infusion and the Risk of the Spread of Tuberculosis

Q.—*Is there any serious risk of spreading tuberculous mastitis by infusion of the udder in suspected cases of chronic streptococcal mastitis?*—"*Nervous.*"

A.—Yes, there is serious risk. Tubercle bacilli may be carried on the teat syphon itself or in the last few inches of the tube by which it is attached to the container of the solution being infused.

The danger from the teat syphon may be avoided by using a sterile syphon for each cow (or quarter). Syphons should be sterilised by boiling for several minutes; preferably being washed through first with detergent solution. Sterilisation can be done on the farm, but it is more convenient to have a supply of syphons sufficient for the day's work, drop them into a detergent solution after use and sterilise all at the surgery. Perhaps in the future supplies of gum-elastic or other syphons may become available at a price would would allow a syphon being used once only.

The danger from infection being carried in the lower part of the tube from the container arises from the fact that udder secretion can, as has been demonstrated, run back into the tube at the end of the injection unless certain precautions are taken. It can be avoided by withdrawing the tube whilst the fluid being injected is still flowing under pressure from the gravity container or pressure bottle, *i.e.*, before the gravity container is lowered or the pressure released. A convenient test that this has been done is to compress the tube near the syphon with finger and thumb (or pinch-cock) and withdraw the syphon, when, on release of the thumb and finger (or pinch-cock), a good stream of injection fluid should run from the syphon. Allowance can be made for the fluid lost where absolute accuracy is necessary.

Boiling should be used for sterilisation because tubercle bacilli are killed within a minute or two by this method, but can still be alive after 24 hours in many antiseptics effective for other organisms, *e.g.*, 5 per cent. phenol.

* * * * *

Uterine Irrigation with Iodine for Sterility in Cattle

Q.—*Have any controlled experiments been carried out to justify the present widespread use of uterine irrigation with iodine as a treatment for sterility in cattle?*—"*Catheter Conscious.*"

A.—So far as I am aware, there are no up-to-date controlled experiments to justify the use of iodine for uterine injection for the treatment of infertility in the bovine, but in December, 1925, Steele-Bodger gives figures supplied by Folmer Nielsen of experiments which the latter had carried out. (*Vet. Rec.*, No. 51, Vol. V. (N.S.)) Nielsen believed that chronic endometritis was the chief cause of sterility, and divided the disease into 'four degrees.' He held that 66 per cent. of chronic endometritis cases were due to the 'first degree,' 20 per cent. to the 'second degree,' 6·6 per cent. to the 'third degree' and 7·3 per cent. to the 'fourth degree.' He recommended treatment by intra-uterine injection of iodine of varying strengths and quantities. Nielsen claimed that of all the cases treated by him by this method, 73 per cent. became pregnant within six months; those which became pregnant after that time were not included, and, for statistical purposes, were considered as barren. The expression of the corpus luteum added another 10 per cent., making 83 per cent. Of the 73 per cent. of the total which were cured by the injection alone, 92 per cent. of the cases of chronic endometritis of the 'first degree' became pregnant, 54 per cent. of the 'second degree,' 35 per cent. of the 'third degree' and 17 per cent. of the 'fourth degree' became pregnant.

Finger-prick Site Reaction to Tuberculin

Q.—*I occasionally prick my finger when testing with tuberculin, and always get a nasty reaction. Is there any application that one can use by way of first aid to prevent a reaction occurring at the site?*—"*T.T.*"

A.—It is probable that the operator is allergic to tuberculin and that the reaction which he experiences is a specific tuberculin response. There is abundant evidence that man is more sensitive to tuberculin given intracutaneously than the bovine species. The standard initial dose of concentrated tuberculin which it is customary to use in a man is a 1:1,000 dilution (0·1 mg.) of "O.T." (See D'Arcy Hart (1932). Medical Research Council Special Report No. 164. H.M. Stationery Office). The accidental introduction of tuberculin in the concentration used for cattle might easily lead to a severe reaction in an allergic person.

Since tuberculin rapidly disperses in the tissues it is doubtful whether any intervention after the accident has occurred would be of any value. The wearing of a glove might diminish the risk by absorbing some of the tuberculin adherent to the needle.

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Treatment of Infra-Orbital Abscess

Q.—*Two months ago I was asked by a client to attend a dog suffering from an abscess on the face just below the eye. With local treatment the condition appeared to improve, but has now commenced to discharge. What treatment do you recommend?*—*Canis.*

A.—You appear to have been dealing with pus in the maxillary sinus probably resulting from a diseased condition of the roots of the upper fourth molar or carnassial tooth. The abscess occurring on the face, below the eye, has apparently ruptured and you are now left with a discharging dental fistula. In cases of apical disease with dental fistula, the first procedure is to remove the tooth. Prior examination of the fourth molar may reveal little or nothing amiss with it, but if it is lightly tapped with a metal object the dog may evince signs of pain. Extraction is then indicated, and the natural drainage which follows most usually effects a permanent cure.

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Conditions Associated with Pain on Forcible Mouth Opening

Q.—*What condition should one suspect as the most likely to inflict pain if a dog's mouth is forcibly opened?*—*Johnson, Thames Ditton.*

A.—Acute tonsillitis is probably the condition most commonly to be met with when pain seems to accompany the forcible opening of a dog's mouth. A rarer cause would be epithelioma in the mouth or pharynx, or acute inflammation of the cheeks, larynx or pharynx. Foreign body or dental pain might occasion it. But if there is merely difficulty in opening the mouth, apart from obvious pain, one must consider the possibility of tetanus, tetany or strychnine poisoning, all of which would present other characteristic symptoms to guide the diagnosis. Many dogs will keep the mouth tightly closed in an attempt to prevent the administration of drugs. Finally, dislocation of the jaw must be borne in mind.

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CORRESPONDENCE

Infectious Feline Enteritis

Sir,—I read with interest, and some little surprise, Mr. Holmes's contribution to the above subject. I would be grateful if he would kindly state upon what premise he bases the opinion that a vermicide *cum* vermifuge administered at one month of age could possibly prevent infection of a cat, with what is probably a virus, in later years of life.

I have never known either calomel or santonin, in one single dose (or for that matter in any number of doses) to confer immunity for life against a virulent infection.

Will Mr. Holmes please explain?

Yours faithfully,
HAMILTON KIRK.

PENICILLIN FOR SWINE ERYSIPELAS

"When supplies of penicillin become more plentiful, it would seem that it will be an effective treatment for swine erysipelas—judging from reports of their laboratory experiments just made by Drs. Heilman and Herrell, of the Mayo clinic," states *Veterinary Medicine*. "In these experiments, of 40 untreated mice infected with the swine erysipelas organism, all died; however, of 40 infected mice treated with penicillin, only two died—a mortality rate of 5 per cent. instead of 100 per cent. as was the case with the untreated infected mice."

REVIEW

[**Sheep Farming.** By Allan Fraser, B.SC., M.D. Crosby, Lockwood and Son, Ltd. 12s. 6d.]

This is an attractive book, of interest to veterinarians and others whose work brings them into contact with the divers problems of sheep husbandry.

The author obviously has a wide experience of the subject and the book is well written and nicely balanced. The section on diseases could well be revised, but it is only fair to remember that this is a reprint and not a new edition. One is somewhat horrified to find a man with a medical qualification advocating drawing with the teeth as the best method of castration, or turning a lamb upon its back *in utero* to deliver it. One was disappointed to read the following sentence: "When disease plays havoc the veterinary surgeon may be called in . . . but his visit is usually he end of a long, long story. Nobody knows that better than a good veterinary surgeon, but his job is not to tell a farmer how to manage sheep. He must give the trouble a name, prescribe something out of a bottle, and try to stop the rot."

The relation of health and disease to husbandry is well discussed.

QUESTIONS IN PARLIAMENT

Agricultural and Veterinary Education

Mr. SALT asked the Minister of Agriculture whether he can yet give any indication as to the steps he proposes to take to implement the recommendations of the Luxmoore and Loveday Reports on agricultural and veterinary education.

Mr. T. WILLIAMS: As regards agricultural education, I would refer my hon. Friend to the statement which my right hon. Friend made in this House on January 20th last. The Joint Advisory Committee to which he referred has been set up and is now at work. For the present I cannot make any further statement. As regards the Loveday Report on veterinary education, my right hon. Friend the Secretary of State for Scotland and my right hon. Friend have already set up a Committee to enquire into the extent and effect of veterinary practice in Great Britain by persons who are not registered veterinary surgeons. Consultations with the Royal College of Veterinary Surgeons and the various institutions concerned with veterinary education are taking place, and I hope that as a result of the consideration being given to this matter, the recommendations of the Loveday Committee will be found to be generally acceptable, but pending the result of these deliberations I am not able to announce what further steps will be taken to implement the recommendations.

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Agricultural Improvement Council

Mr. PRICE asked the Minister of Agriculture whether it is intended that the reconstituted Agricultural Improvement Council should meet more frequently than the former council; how often the new body has already met; and whether he can give any indication of its activities.

Mr. T. WILLIAMS: The reconstituted Agricultural Improvement Council for England and Wales, which has already met twice, will in future meet more frequently than its predecessor. I would, however, like to make it clear that the Council's work is largely carried out by Standing and *ad hoc* Committees. The Council's activities have the widest possible range, and I am sending my hon. Friend a sample list of the subjects which are engaging their attention.

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Demonstrations and Experiments

Mr. SALT asked the Minister of Agriculture if he can give a list of the existing demonstration and experimental farms in England and Wales; and whether he has any plans for increasing their number.

Mr. T. WILLIAMS: Demonstrational and experimental work in England and Wales is spread over such a wide range of farms, including farms connected with agricultural educational institutions, that it would hardly be practicable to furnish a list of those farms on which some work of this nature is carried out. In connection with the setting up of a National Agricultural Advisory Service, the question of providing further facilities for demonstrational and experimental work is under consideration, particularly the establishment of a number of experimental husbandry farms for testing the results of research on a field scale.

Agricultural Research

Mr. Price asked the Lord President of the Council what is the present annual expenditure on agricultural research in Great Britain and under what headings is it subdivided.

Mr. Attlee: The estimated expenditure on agricultural research in Great Britain for the current financial year is about £670,500, sub-divided as follows:—

Agricultural Research Council	£
Research grants	155,000
Field Station	*48,500
Administration	18,500
	222,000
Research Institutes, etc.	†409,000
Research scholarships and studentships	500
Miscellaneous researches	39,000
Total	‡670,500

* (Including £20,400 capital.)
† (Including £5,200 capital.)
‡ (Including £25,600 capital.)

NOTES AND NEWS

The Editor will be glad to receive items of professional interest for inclusion in these columns.

Diary of Events

Nov. 25th.—Annual General Meeting of the Society of Women Veterinary Surgeons, in London (69, Great Peter Street, S.W.1), 2.15 p.m.

Nov. 29th.—Meeting of the Royal Counties Division, N.V.M.A. at Reading (The University), 2.30 p.m.

Nov. 30th.—Meeting of the Lincolnshire and District Division, N.V.M.A., at Lincoln, 2 p.m.

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PERSONAL

Birth.—Bagenal.—On November 8th, at Hertford County Hospital, to Elizabeth (*née* Maxted), wife of F/O Beauchamp Bagenal—a daughter.

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Marriage.—Crawford—Hunter.—On November 8th, 1944, at Newlands Congregational Church, Lincoln, John Ewing Crawford, M.R.C.V.S., of 6, Monk's Road, Lincoln, to Winifred Mary, younger daughter of the late Mr. Frank Hunter and Mrs. Hunter, of Lincoln.

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Appointments.—The appointments in the Colonial Veterinary Service are announced of Mr. R. D. Hodgins, M.R.C.V.S., as Veterinary Officer, Northern Rhodesia, and Mr. R. P. Lee, M.R.C.V.S., as Veterinary Officer, Tanganyika.

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Fitzwygram Prizewinner.—Mr. David Gwilym Evans Davies, M.R.C.V.S., of Vaerdre Llandyssul, S. Wales, who qualified at the London Veterinary College in July last year, has been awarded the First Fitzwygram Prize, which is awarded to the student who obtains the highest number of marks in the five professional examinations in all the veterinary colleges of Great Britain and Ireland.

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University of Edinburgh Degree of B.Sc. (Vet. Sci.).—At the recent graduation ceremony at Edinburgh University, the degree of Bachelor of Science (Department of Veterinary Science) was conferred on Hugh Maxwell Scott, younger son of Mr. and Mrs. J. Maxwell Scott, of Kingsend, Ruislip. All the graduates in this section were marked *in absentia*, as they are all now commissioned officers as veterinary surgeons with the armies in the field.

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R.C.V.S. OBITUARY

Morris, Lewis Trevor, Flying Officer, R.A.F.V.R. Veterinary Inspector, Animal Health Division, Ministry of Agriculture and Fisheries; formerly stationed at Carmarthen, South Wales. Graduated Edinburgh 1936. Killed on Active Service November 3rd, 1944.

Pugh, D., Sevenoaks, Kent. Graduated May 16th, 1890. Fellow May 14th, 1897. Died November 6th, 1944.

Roll of Honour

Flying-Officer Lewis Trevor Morris

The death on active service of Trevor Morris has deeply shocked his many friends, not only within the profession, but in the wider fields where his many activities led him. A York scholar, he took the N.D.A. at King's College, Newcastle, and gained a wide experience of practical farming before proceeding to the Royal (Dick) Veterinary College, Edinburgh, where he graduated in 1936. After a period in practice at Gloucester he joined Animal Health Division of the Ministry of Agriculture and Fisheries in February, 1938, being stationed at Carmarthen, South Wales.

Everything he did he did well. He was an all-round athlete, his particular sports being rugby and tennis. He was an outstanding rifle-shot also, but perhaps his keenest interest lay in rock climbing, and many of his leaves were spent in Skye.

Within the profession his painstaking thoroughness, capability and integrity were recognised by all who came into contact with him; he had also in great measure the humbler virtues of kindness and generosity. On the outbreak of war he gave all his spare time to Civil Defence, serving first with the Home Guard and later with the National Fire Service, but as time wore on his sense of duty, always the guiding factor in his life, led him to believe that he could best serve his country in a more active capacity. He was released from the Ministry and joined the Royal Air Force in August, 1942. In this service his fine qualities of leadership, high personal courage and self-reliance were utilised to the full. He completed his training in Canada, gaining the Pilot's wings and commission in December, 1943. He then proceeded to Transport Command, where his arduous duties were tackled with the enthusiasm that was so typical of him.

Just prior to joining the Royal Air Force he married Lavine, only daughter of Mr. and Mrs. G. Davies, Thomas Street, Llanelly. To his widow, his parents and his brothers the sympathy of all members of the profession is extended. It was a privilege to have known him and an honour to be admitted to the intimacy of his friendship. He will not be forgotten.

D. R. C.

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Mr. Barry Gunn Catmur, M.R.C.V.S.

A Tribute

In connection with the death of Mr. B. G. Catmur, M.R.C.V.S., which we recorded with much regret in our last issue, a colleague writes: "The passing of Barry Catmur has caused great grief to his many friends both within and without the profession. His illness was short and his death unexpected, though for the past year he had not enjoyed his customary good health. He took over his brother's practice in 1931 and since then has become exceedingly popular with his neighbouring practitioners and with an extensive clientele. At college he was also very popular and known to everyone. He was an enthusiastic member of the Students' Union at the London College when it badly needed support and took an active part in all college activities. He was always ready to give a helping hand to anyone who needed it, and his hospitality and generosity were well known. Although a great believer in improving the status of the profession and in the elimination of quackery, he was too busy in practice to take an active part in veterinary politics. He was particularly keen on the young and on general education. When the J.T.C. was started in Abingdon he found time to devote to training cadets though his day was a full one. He also found time to lecture on agricultural subjects to senior pupils at a school in the neighbourhood and the keen ones were welcome to accompany him on his rounds. By these associations his mind was always keen and attuned to new ideas. A good talker and a charming personality he was interesting company and always said what he thought. He was devoted to his family and the writer's last memory of him is at play with his young daughter of just over two years. Mr. Catmur leaves a widow and three children and the sympathy of the profession is extended to them and to Barry's father in their bereavement."

The funeral took place at Oxford Crematorium on Friday, November 3rd. The profession was represented by Messrs. R. M. Davidson, E. J. Heather, T. A. R. Filgate, A. Messervy and W. A. Milligan.

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Mr. G. A. M. Harle, M.R.C.V.S.

Coldstream

An Appreciation

The suddenness of the death of G. A. M. Harle, M.R.C.V.S., on October 22nd, announced in your last issue, added to the sense of loss of the large company which assembled to honour the memory of one who was held in the highest respect by all who knew him.

To the community in the rural area on the eastern part of the border between Scotland and England, the name of Mr. G. A. M. Harle will long be respected, not only for the professional care of their animals, but for the genuine friendly sympathy of the man, ever ready to give a helping hand to those in trouble or distress. Such a life lived away from the limelight of professional politics probably does more to raise the esteem of the profession in the eyes of the public than much clamour about professional rights, and it is good for many of us to be reminded that no matter how isolated we may be we can each of us raise the status of our calling by gaining the esteem of the community in which we live.

As senior elder of the Parish Church of Coldstream, and member of the local School Management Committee, he played an important part in local citizenship, but the Royal (Dick) Veterinary College, where he obtained his training as a veterinary surgeon, owes him a particular debt of gratitude for his services over a period of 21 years as a member of the Board of Governors from 1918-39.

The profession was represented at the funeral by Professor W. M. Mitchell, Mr. A. McTurk and Mr. E. G. Duncan.

W. M. M.

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THE MILK MARKETING BOARD APPOINTMENT

As announced in a recent issue, Mr. Joseph Edwards has been appointed by the Milk Marketing Board to be head of the new Dairy Husbandry Department, and will take up his duties as soon as he can be released from his present appointment with U.N.R.R.A. He will be responsible for the development of the department, and will take charge of the artificial insemination centres to be operated by the Board, and of the organisation of National Milk Records.

Mr. Edwards is not a veterinarian, but he is well known to the profession and will be in constant contact with our members during the course of his work for the Board. This opportunity is taken of wishing him every success in the important tasks that lie before him. In Great Britain the exact sphere of veterinary duties is not well defined, at least in official circles, and there is not always the best of understanding between veterinary scientists and others working on animal health problems. The best way in which this situation can be overcome is for both parties to work together in mutual confidence upon the same tasks. Opportunities for collaboration of this kind will arise freely in the development of the Dairy Husbandry Department, and all may look forward with confidence to the results. It is hoped that Mr. Edwards will be a frequent visitor at Divisional and other veterinary meetings.

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"DRUGS AND THE DOCTOR"

Inasmuch as the position outlined therein is in many respects comparable to that which obtains in the veterinary profession, we quote below at some length from the leading article, headed as above, appearing in the issue of the *British Medical Journal* of October 21st:—

One of the most noticeable hiatuses in the White Paper is the failure to consider the bearing of a National Health Service on the supply of drugs and apparatus. . . . The White Paper does not consider the general problems that will arise if medical care is provided free by the State but at the same time the supply of drugs is left to private enterprise. It is a little difficult to see how doctors are "to encourage a new attitude to health" if the patent medicine industry continues to spend £3 million a year on advertisements suggesting to people that they are ill and that they can only be cured by proprietary remedies.[1] As a result of this campaign, apparently, three out of four people in this country are taking drugs without medical advice and in many cases to the detriment of their health.[2] The use of proprietary remedies has increased since the introduction of National Health Insurance, and sales are much more closely correlated with factors such as the level of wages, the expansion of the popular press, and the development of mass advertising, than with the standard of medical care. The proprietary medicine industry employs a capital estimated at more than £100 million and the annual turnover is thought to reach the figure of £20 million.[3] By and large its effects on personal and social health are harmful, but no Government has ever had the strength or courage to control it. The Pharmacy and Medicines Act, 1941, was merely a cartel agreement between the pharmaceutical profession and the proprietary medicine industry, which divided the retail market for drugs. It was better than many cartel agreements in so far as it was signed publicly in Parliament and not behind closed doors. The net result, however, was that proprietary medicines can now be sold without licence or duty over the counter of any shop in the country.

A second problem that arises is whether a National Health Service is compatible with the advertisement of pharmacopoeial drugs such as soluble barbitone or sulphanilamide under proprietary names. It is true that under the Pharmacy and Medicines Act such drugs cannot be sold by retail unless the label also bears the *B.P.* or *B.P.C.* description, and that a medical prescription is required for their supply to the public if they come within the Poisons Rules, but there is nothing to prevent concentrating publicity on the brand name. As a result of this practice sulphanilamide was being offered in this country under fifty-odd names at the last time of recording. Most of the firms engaged in this trade were buying sulphanilamide from a common source and merely labelling and packing it independently. The object was to make a profit, and not to supply a consumer need, for when a drug is sold under a proprietary name it costs on the average three times as much as when sold under the official name. A third problem arises out of the change in prescribing habits which has occurred during the war. A generation of doctors has grown up which is completely unfamiliar with many of the galenical preparations such as gentian, ipecacuanha, and the vegetable diuretics. Quinine has been banned except for malaria, and even in malaria it has been declared inferior to mepacrine (atebrin) in a recent official American pronouncement.[4] Bismuth salts have been forbidden here for dyspepsia and replaced by magnesium trisilicate and aluminium hydroxide. Sulphonamides and penicillin have ousted other antiseptics and chemotherapeutic agents in local, general, and urinary infections. During the war the Therapeutic Requirements Committee of the Medical Research Council has dealt out rough justice in this field, and permission to import or to manufacture has largely depended on the assessment of drugs in M.R.C. War Memorandum No. 3, "Economy in Drugs in War-time." What is to happen when controls are relaxed after the war? No medical service is likely to be a success unless it leaves the individual practitioner considerable freedom in prescribing. Is the doctor to become the unsuspecting victim of pressure groups interested in restoring the sales of iodine, bismuth, quinine, or borax? Is his post-box to be crammed with expensive advertising matter, and will he need to set aside a whole morning a week when he will be at home to the travellers? Or is the supply of drugs to depend on a judicial appraisement of the best interests of the consumer as well as the producer?

The difficulty is that no one has a vested interest in sane pharmacotherapeutics, and therefore active steps must be taken by the profession or the community to redress the balance. The individual doctor or patient must be supplied with unbiased information. The Americans manage these things better than we do, and a recent account of the Council on Pharmacy and Chemistry of the American Medical Association deserves serious study in this country.[5] The Council has no legal powers, but most readers will agree with the claim that no single body in modern times has brought about so much change in the practice of therapeutics. The Council derives its influence largely from the important group of medical journals published by the American Medical Association, whose pages are closed to advertisements or names of preparations which are not approved by the Council. Its success has been such that it has become a model for the Council on Physical Therapy, the Council on Foods and Nutrition, and the Council on Dental Therapeutics. It consists of 17 members, chiefly professors of medicine and pharmacology in the American medical schools, who work without remuneration but with a whole-time medical secretary. The Council does not initiate clinical trials, and as a general rule the manufacturer must submit the evidence for therapeutic or other claims, which is then reviewed by the members of the Council, together with advertising material and other pertinent data. All the Council's actions, whether of acceptance, rejection, or omission, are published in the *Journal of the American Medical Association*, and later in the book *New and Non-official Remedies* or in the annual reprints of the reports of the Council. The Council's work has been of immense educative value to the members of the American Medical Association, for, however keen an observer the individual clinician may be, he cannot research on all the diseases all the time. It has overcome the kind of difficulty which occurs when new and potentially dangerous drugs are introduced to the profession. . . . It is above all in the practice of correct nomenclature that the Council on Pharmacy and Chemistry has done most good, and it must be confessed that the advertising pages of medical journals and the demonstration stands at medical exhibitions in Great Britain compare unfavourably with their American counterparts.

Another step which might be taken to redress the balance against tendentious advertising is to improve the official teaching of pharmacology. . . . It must be remembered that continuous postgraduate education is necessary in a subject which changes so rapidly as therapeutics. The universities must strengthen their pharmacology departments both with a view to research in a field where we have hitherto lagged behind the Germans and the

Americans, and with a view to what might be called the adult education of the profession. Few papers are so well received by a medical society as a good presentation of recent advances in therapeutics, and university pharmacologists should be provided with the time and the encouragement for frequent lectures of this kind.

(1) Thompson, D. (1943.) Voice of Civilisation. London.

(2) Davies, J. N. P. (1944.) *British Medical Journal*. 2. 87.

(3) Chapman, H. E. (1942.) The Law Relating to the Marketing and Sale of Medicines. Bedford.

(4) Report by Board for the Co-ordination of Malarial Studies, National Research Council. (1944.) *J. Amer. med. Ass.* 125. 977.

(5) Smith, A. E. (1944.) *Ibid.* 124. 433.

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SCHEME FOR THE CONTROL OF DISEASES OF DAIRY CATTLE

Statement showing the Number of Undertakings notified to the Ministry of Agriculture during the Month ended October 31st, 1944

County	Undertakings Notified		Total Undertakings		
	During Month	Previously	Number	Number of Cattle	
				Cows	Heifers
ENGLAND					
Bedford	—	43	43	991	538
Berks	—	105	105	3,553	2,208
Bucks	—	96	96	3,198	1,777
Cambridge	—	14	14	344	208
Chester	3	409	412	13,480	4,594
Cornwall	—	4	4	72	75
Cumberland	—	65	65	1,618	1,411
Derby	3	329	332	9,487	5,424
Devon	3	280	283	4,253	2,534
Dorset	1	70	71	2,193	1,145
Durham	—	284	284	6,224	2,142
Essex	1	260	261	9,325	5,425
Gloucester	—	109	109	3,177	1,824
Hampshire	3	410	413	11,481	7,745
Hereford	—	24	24	339	221
Hertford	—	78	78	2,346	1,434
Hunts	—	13	13	475	302
Isle of Ely	—	3	3	83	75
Isle of Wight	—	14	14	252	127
Kent	—	156	156	3,969	2,299
Lancs	—	204	204	5,816	1,845
Leics	2	99	101	2,621	1,800
Lincs (Holland)	—	3	3	25	11
Lincs (Kesteven)	—	25	25	334	142
Lincs (Lindsey)	—	105	105	2,000	1,122
Middlesex	—	16	16	641	307
Norfolk	2	195	197	5,955	4,111
Northants	2	85	87	2,420	1,853
Northumberland	—	68	68	2,329	1,112
Notts	5	159	164	3,653	2,204
Oxford	1	43	44	1,294	1,162
Rutland	—	8	8	138	91
Salop	1	278	279	8,502	4,084
Soke of Peterborough	—	1	1	37	31
Somerset	5	238	243	6,268	2,918
Staffs	—	220	220	6,419	3,442
Suffolk, E.	3	97	100	2,312	1,697
Suffolk, W.	—	51	51	1,054	631
Surrey	2	108	110	3,143	1,454
Sussex, E.	2	177	179	4,612	2,611
Sussex, W.	2	130	132	3,571	2,127
Warwick	1	139	140	3,453	2,135
Westmorland	—	14	14	414	506
Wilts	2	94	96	3,899	1,833
Worcester	2	163	165	3,457	1,608
Yorks, E.R.	—	106	106	1,663	946
Yorks, N.R.	—	117	117	2,344	1,439
Yorks, W.R.	2	268	270	6,553	2,542
WALES					
Anglesey	—	48	48	836	611
Brecon	—	9	9	199	108
Caernarvon	—	113	113	1,799	970
Cardigan	1	29	30	537	363
Carmarthen	2	237	239	4,296	2,193
Denbigh	1	60	61	1,355	653
Flint	1	115	116	2,576	1,134
Glamorgan	1	103	104	1,737	677
Merioneth	—	10	10	125	68
Monmouth	—	55	55	1,325	775
Montgomery	—	15	15	296	222
Pembroke	—	85	85	1,624	1,145
Radnor	—	—	—	—	—
TOTALS	54	6,856	6,910	178,442	96,191

Notes.—(1) Operative periods of undertakings: 1 year, 1,338; 2 years, 609; 3 years, 4,963. (2) Undertakings renewed for a further period: 1 year, 717; 2 years, 142; 3 years, 133. (3) Undertakings not renewed at end of operative period, 431. (4) The figures showing the number of undertakings notified during the month relate to entirely fresh undertakings and do not include undertakings renewed for a further period.

Undertakings which have been cancelled or not renewed are not included in the figures for previous notifications.

County	Undertakings Notified		Total Undertakings		
	During Month	Previously	Number	Number of Cattle	
				Cows	Heifers
SCOTLAND					
Aberdeen	—	26	26	1,025	289
Angus	—	21	21	812	395
Argyll	—	6	6	113	115
Ayr	—	39	39	1,257	955
Banff	—	3	3	119	42
Berwick	—	2	2	53	22
Bute	—	—	—	—	—
Caithness	—	—	—	—	—
Clackmannan	1	6	7	279	246
Dumfries	—	14	14	744	613
Dumbarton	—	3	3	105	86
East Lothian	—	3	3	145	88
Fife	1	33	34	1,254	506
Inverness	—	10	10	349	192
Kincardine	—	5	5	231	126
Kinross	—	3	3	59	32
Kirkcudbright	—	16	16	972	694
Lanark	—	20	20	683	486
Midlothian	—	1	1	44	69
Moray	—	—	—	—	—
Nairn	—	1	1	14	—
Orkney	—	—	—	—	—
Peebles	—	4	4	54	21
Perth	—	32	32	720	427
Renfrew	—	9	9	384	297
Ross-shire	—	3	3	89	65
Roxburgh	—	—	—	—	—
Selkirk	—	—	—	—	—
Stirling	—	29	29	871	672
Sutherland	—	4	4	76	66
West Lothian	—	1	1	23	18
Wigtown	—	24	24	1,464	705
Zetland	—	—	—	—	—
TOTALS	2	318	320	11,939	7,227

Notes.—(1) Duration of undertakings: 1 year, 40; 2 years, 38; 3 years, 242. (2) Undertakings renewed for a further period (included in column 2 of statement): 1 year, 32; 2 years, 5; 3 years, 5. (3) Undertakings expired and not renewed (not included in column 2 of statement): 59. (4) The figures showing the number of undertakings notified during the month relate to entirely fresh undertakings.

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R.C.V.S. ANIMAL MANAGEMENT EXAMINATION

List of Successful Candidates

LONDON:

Ablett, R. E.
Appleby, E. C.
Barnett, D. N.
Beale, R. K. (Credit)
Beattie, W. E.
Brook, A. B.
Brown, A. M.
Chamberlain, Miss J. F.
Cradock, G. J. G.
Chapman, J. A. J.
Cross, B. A.
Darcel, C. Le Q.
Delfosse, Miss M. L.
Diffey, S. J. K.
Griffiths, E. C.
Hull, Miss B. A.
Jones, B. R.
Jones, P. L.
Kingsbury, P. A.
Lewis, D. G.
Lloyd-Griffiths, F.
Martin, I. L.
Pay, T. W. F.
Redfearn, M. S.
Rees, J. V.
Rickards, D. A.
Slater, L. F.
Vivian, Miss I. P.

LIVERPOOL:

Broughton, J. E.
Walker, R. J. B.

(To be continued)

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CONTROL OF DAIRY INSPECTION IN SCOTLAND

In its current issue *The Farming News and North British Agriculturalist* observes: "The Ministry of Social Security, of which Sir William Jowitt is expected to be the first head, will have transferred to its control a host of functions including that of health administration on both sides of the Border. This means that the Secretary of State for Scotland will no longer be responsible for health administration.

"Let us try to follow out the implications of these changes. The Department of Health in Edinburgh is the body that centrally issues instructions to local authorities on all matters pertaining to dairy by-laws. Does the new Social Security move mean that Scotland's dairy by-laws, and the inspections of farm premises based upon these by-laws, will be centrally controlled by the Minister of Social Security in London instead of by the Department of Health in Edinburgh? Or will the Department of Health still be in charge and will it be answerable not to Mr. Johnston but to Sir William Jowitt? That alternative, to our mind, again means control from London.

"The point is interesting for many reasons. Inspection of dairy premises (under the Milk White Paper) is transferred from English

and Welsh local authorities to the Ministry of Agriculture's veterinary staff, a step for which Scotland asked but was denied. The denial was based on the plea that local authorities in Scotland are doing the job efficiently. But if our reading of the new Social Security Bill is correct, there is now to be no compunction in switching over the direction of affairs from Edinburgh to Whitehall, as our local sanitary inspectors will be answerable to directions from the new Ministry. We leave this puzzle to the Farmers' Union to solve. The simple way of settling dairy by-laws administration in Scotland is to ask the veterinary officers to do the job here, as over the Border. Remember that Dr. Mattick, the Reading dairying expert, bluntly told a Glasgow conference recently that he does not regard sanitary inspectors as the proper parties to inspect pasteurising plants. Farmers likewise regard these local officials as unsuitable for byre and other inspections on dairy farms."

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GLASGOW PRIZE DISTRIBUTION CEREMONY

The need for new and adequate premises for the Glasgow Veterinary College was stressed by the Lord Provost of Glasgow (Mr. James Welsh) at a prizegiving ceremony on November 3rd.

The present building, he said, was hardly in keeping with the importance of the work undertaken, and in the post-war period, he suggested, one of the main items on the programme should be the erection of a new college, with architectural dignity and all the equipment and facilities needed for the teaching of the veterinary profession. That should be provided as soon as possible.

Mr. Alexander Murdoch, C.A. (Chairman of the Board of Governors), who presided, referred to the great loss sustained by the College during the past year through the death of Principal Whitehouse, Professor Duncan and Professor Shaw Dunn. He stated that the Governors, in consultation with the new Principal, were improving the facilities for instruction, and that further improvements within the establishment were under consideration. He acknowledged the indebtedness of the Governors to the various local authorities and organisations for their contributions towards the funds which enabled the College to continue to exist.

On behalf of the Governors a gown and cap for the new Principal, Mr. Donald Campbell, were presented by Dr. Russell Greig, Director of the Animal Diseases Research Association, and were accepted by Mrs. Campbell on behalf of her husband, who was unable to attend because of indisposition.

A closer relationship than had existed in the past between the two veterinary colleges of Scotland was urged by Dr. Russell Greig. It was the first occasion, so far as he was aware on which a representative of the Royal (Dick) Veterinary College, Edinburgh, had been invited to participate in a function in the Glasgow College, and he looked upon himself as symbolic of that good neighbourliness, co-operation and fraternal relationship that must in future exist between those institutions. If there had been misunderstandings in the past they should forget them and work together after the war in good fellowship for the advancement of veterinary education and through that for the advancement of their great science.

Principal Prizewinners

The gold medal for the best aggregate in professional examinations without one failure throughout the past five years' course was won by T. C. Denholm, Glasgow, who also gained the silver medal in surgery and certificates in medicine and surgery. He qualified M.R.C.V.S. (with Credit in Medicine) in July.

The silver medallists were: Fifth year—C. C. Bannatyne and Joseph Parker (in medicine). Fourth year—Miss Catherine Mackenzie (in pathology) and John Burns (in parasitology). Third year—Gilbert Young (in pharmacology and senior anatomy), and Roderick S. Campbell (in hygiene). Second year—David Lornie (in physiology), Henry W. Pfaff (in histology), D. M'Cracken (in junior anatomy), and George Urquhart (in animal management). First year—Neville J. Harrison (in chemistry) and Miss M. E. Millar (in biology).

Miss Doris H. Crawford was awarded the special prize given by Mrs. Marshall for the best aggregate among the women students for animal management (first and second years). The annual prizes presented by the Governors for the best "student addresses" during the session were divided equally between C. C. Bannatyne and Peter S. Hastie.

John Burns, Burnside, Dumbarton, gained the Evans final year studentship (£42 10s.) granted through the Veterinary Educational Trust to the fourth year student with the best record.

CORRESPONDENCE

The views expressed in letters addressed to the Editor represent the personal views of the writer only and must not be taken as expressing the opinion or having received the approval of the N.V.M.A.

Letters to the Editor should reach the Office not later than by the first post on Monday morning for insertion in following Saturday's issue.

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AN OUTBREAK OF BOVINE TUBERCULOSIS DUE TO UDDER IRRIGATION

Sir,—In the issue of *The Veterinary Record* of October 7th, 1944, you published an illuminating record of an investigation of an outbreak of tuberculosis in an attested herd of bovines; in the herd history it is stated the herd had a bad record of mastitis: one wonders if milking machines were the regular method of milking the cows, and if such was the case, was the three-stall or smaller pen used?

My experience of an outbreak of mastitis in a local herd was that the catarrhal mastitis was not followed by tuberculosis of the udder in any of the cases treated. As one who has never irrigated a cow's udder with any solution, may I suggest that perhaps that is the reason why none of the affected cows developed tuberculosis of the udder. I may say that since the owner, on my advice, discarded his milking machines, he has not had mastitis among this herd.

In my experience, there is another factor in the cause of tuberculosis of the udder in this district, *viz.*, even nowadays the herdsmen of some owners inflate the cow's udder for the cure of milk fever and sometimes tuberculous mastitis supervenes.

Yours faithfully,

139a, Handford Road, Ipswich. "Old Stager."

October 18th, 1944.

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LESSER-KNOWN LESIONS OF DIAGNOSTIC VALUE IN BOVINE TRYPANOSOMIASIS

Sir,—Although Mr. Waddington has recorded some interesting observations in connection with bovine trypanosomiasis, one is compelled to agree with Mr. Hornby, writing in *The Veterinary Record* of April 1st, 1944, in reply to the article by Mr. Waddington (*Vet. Rec.* **56**. 1. Pp. 2 and 3) that the conclusions arrived at by the latter require checking before they are accepted as a definite contribution to our knowledge of bovine trypanosomiasis.

Mr. Waddington's letter in reply to Mr. Hornby (*Vet. Rec.* **56**. 32. p. 289) gives the impression that he wished to modify some of the rather sweeping statements made in the original article. He states in his letter that ". . . even if the condition (*i.e.*, tongue ulceration, together with dermatitis and loss of the hair from the end of the tail) is due simply to poor circulation of anaemic blood, it nevertheless occurs frequently in trypanosomiasis, and although it may be a secondary symptom only, it should in my opinion be included in the complete clinical picture." In the original article, however, he states that "These two lesions, when they occur concomitantly with symptoms of emaciation and anaemia, are, in the writer's opinion, pathognomonic for chronic trypanosomiasis and justify a positive diagnosis of the condition from a clinical examination alone, without resort to the microscope." Later, he states, "When the tongue and tail lesions, both in an active state are seen both together, with or without signs of anaemia and loss of condition of the patient, they are, in the writer's opinion, proof of *T. congolense* or *T. vivax* infection." The definition of pathognomonic, according to Black's "Veterinary Dictionary," is "A term applied to those signs or symptoms of a particular disease which are characteristic of that disease and on whose presence or absence the diagnosis depends." It is difficult to reconcile Mr. Waddington's statements with this definition.

With regard to the tongue ulceration, experience during the mouthing of approximately 2,000 head of healthy cattle for export in a fly-free area, shows that "grass" ulcers are comparatively common in cattle in this country and occur almost exclusively in the site mentioned. I cannot agree, therefore, that ". . . it is unlikely that 'grass' ulcers would originate consistently in the mid-line in the transverse groove anterior to the dorsum of the tongue without other ulcers elsewhere in the buccal cavity."

It is to be doubted if even the really "cattle-minded" native owners in Tanganyika often examine the mouths of healthy cattle. Cattle that die as a result of trypanosomiasis are presumably the chief source of meat near the fly belt and if some of these carcases are seen to have ulcers on the tongue, it would be consistent with a tendency amongst Africans for them to assume that the condition was concomitant with the trypanosomiasis infection.

Many of the cattle that enter the nagana treatment centres in Ngamiland are in a fairly advanced stage of the disease, but no marked loss of hair from the tail has been noted, although a degree of dermatitis of the end of the tail may occur and in a number of cases it is accompanied by cracking and exudation.

As requested by Mr. Waddington, however, observations will be maintained, and it should be possible to ascertain whether or not the lesions described can be used as an aid to diagnosis in cases of trypanosomiasis in the Bechuanaland Protectorate and the findings will be published in due course.

Yours faithfully,

Maun, Ngamiland. H. A. Crawshaw.

Bechuanaland Protectorate, S. Africa.

October 20th, 1944.

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THE DEMOBILISED VETERINARY SURGEON

Sir,—Enquiries have been made since the publication of Flight-Lieutenant Wooldridge's letter, and I would draw his attention and that of other serving members of the profession to the Government's Further Education and Training Scheme as explained in Leaflet P.L.120/1943.

This scheme covers the case of a demobilised member of the Forces who requires a "refresher" course to enable him to follow his previous profession, and lays down that the award to a successful applicant will be in the form of a grant enabling him to take the full course of training which he may need. A successful applicant may also be awarded a maintenance allowance: in the case of a married applicant a reasonable maintenance allowance will be paid in respect of his wife and children, if any, subject to some limitation if the applicant or his wife has an income.

Copies of Leaflet P.L.120/1943 can be obtained from Forces Education Officers or from local offices of the Ministry of Labour.

It is understood that the affiliated veterinary colleges have the matter under consideration and will no doubt be arranging refresher courses to suit the needs of the applicants.

Yours faithfully,
F. Knight,
General Secretary.

National Veterinary Medical Association of Great Britain and Ireland,
36, Gordon Square, London, W.C.1.
November 7th, 1944.

Sir,—In reply to Flight-Lieutenant Wooldridge's letter may I make the following suggestions:—

1. A panel to be drawn up *now* of veterinary surgeons willing to take demobilised members for refresher courses without fee and if necessary provide accommodation.
2. The course to last three months.
3. Those wishing to take the course choose three names from the panel and spend one month in each practice. This would ensure variety.

I shall be happy to take part in such a scheme.

Yours faithfully,
F. Beckett
(B.E.F., France, 1915-18.)

Berkeley Lodge, Blandford, Dorset.
November 4th, 1944.

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THE FUTURE OF THE VETERINARY PROFESSION

Sir,—One would hope that all responsible bodies in the profession are alive to the need expressed by Flt.-Lieut. Wooldridge for refresher tuition for those members who will be returning from service in the armed Forces. One would have imagined that the R.C.V.S., through consultation with the teaching schools, would now be in a position to make a pronouncement on this important matter and so allay the anxiety of serving members.

From the correspondence on the subject, it seems that the majority of contributors are agreed that a closer connection with the universities is desirable. The majority are also agreed that the Second Report of the Loveday Committee forms a useful basis for discussion and negotiation between the interested bodies. That it is time for the profession to reorientate its views as to its future spheres of usefulness to the community cannot be doubted, hence the contemplated change from the day of the private veterinary school to the day of the veterinary school within the university is a corollary to a change in outlook of the profession as to its duty to the State.

The question has often been asked both in correspondence and in public, "Is there need for an increase in the numbers of veterinary surgeons?" We all know that a state of unemployment and depression existed within the profession in pre-war years co-existent with an era of agricultural depression, but we must also realise that this depression within our ranks was not due to a lack of available work but to the fact that it was economically impossible for farmers, many of whom were living on capital, to utilise the services of members. The fear exists that in the post-war era an analogous position may arise and that our profession may again suffer a depression. The Loveday Committee make it quite clear that any recommendation they make for the future of the profession is entirely dependent on the maintenance of a prosperous agriculture. Lacking an indication from the Government of its post-war policy for agriculture but assuming its prosperity, wherein does the need for an increase in the number of graduates lie?

Heretofore, the practitioner has been concerned mainly in the treatment of individual animals and it is a comparatively new development for farmers to become disease conscious with regard to their herds or flocks as a whole. Where owners have awakened to this fact, a new responsibility has been placed on the shoulders of the practitioner, and one, moreover, which proves time consuming. The combined effort of the M.o.A. and the N.V.M.A. in producing the Survey Scheme was praiseworthy but has failed for two principal reasons:—

1. More was claimed for the suggested measures of control and treatment than could be obtained in the field.
2. Practitioners have not the time to devote to the scheme which its successful application demands.

This suggests that if the profession is to play its part in preventive medicine, then this work should be divorced from private practice and should be undertaken by a greatly enlarged State service. In the profession there is ample room for both. One of the principal difficulties of the recent graduate has been to find an opening in private practice. Many practices are too large, many so large as to be practically unmanageable even for the treatment of individual cases apart from any question of preventive medicine. The bonding of assistants to areas and periods of time far exceeding those desirable in the public interest has helped to maintain this state of affairs. We have a duty to discharge, but under such conditions as exist, with individuals controlling excessively large practices, we cannot discharge it. If we are effectively to control disease, then pecuniary considerations must be forgotten. Openings in general practice will be even less with the introduction of the Ministry's new panel scheme, for when assistants are allowed to do panel work many will remain assistants for ever and a day.

If preventive medicine cannot properly be initiated through private practice then it must be done through an extended State service. There are large areas in the more sparsely populated areas without any veterinary attention or advice. In such areas the medicine vendor reaps a rich reward, where one sees biological products sold under the name of the local vendor. In such areas we should follow the Scottish example and subsidise practitioners. All this demands more graduates, who are also required in the colonies, by local authorities, for artificial insemination centres and for research and teaching institutions. Work which the profession should be doing is being done by others. The Milk Marketing Board takes over artificial insemination, geneticists play with animal physiology, dairy bacteriologists with affections of the reproductive organs, while agricultural organisations issue as conclusive their views on the efficacy of biologicals. The Animal Health Division remains silent. (No pronouncement was ever made to a worried profession as to why Str. 19 Abortus vaccine was adopted for cattle other than calves, or why Str. 45 (20) is being conveniently forgotten; hence all members hear is a conflict of rumour.) We need graduates and we need them urgently. Where are they to be trained?

Whatever our individual views, it is obvious that the consensus of opinion amongst educationalists is that all higher education should be on a university basis. If that is the accepted opinion, we should be unwise, and constitute too small a profession, to stand outside, and we should sail our ship accordingly. The Loveday Report contains much that is good and much that is mediocre, especially the salaries suggested for veterinary teaching staffs, but it does form a basis for discussion with the universities concerned. It should be accepted in that spirit. Probably the greatest stumbling block to negotiation would be the subject of examiners. The consensus of opinion amongst educationalists is strongly in favour of internal examiners, but initially at any rate one would suggest that external examiners would be desirable and necessary.

In conclusion, I had hoped to see a report of the discussion on the motion of the immediate Past-President of the N.V.M.A., "To discuss a long-term policy for the profession." This seems so much more important than a discussion as to whether we should be mere "Vets." or veterinary surgeons.

Yours faithfully,
H. I. Field.

31, Approach Road, Margate.
November 6th, 1944.

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THE ABBREVIATION "VET."

Sir,—How hard it is to understand one's fellows! It seems impossible that at such a time as this any veterinary surgeon can be found worrying about being called a "vet."

"To vet." and "to be vetted" are expressions which have become part of our language and imply a great compliment to the profession. "To vet." means to examine, and the inference that may fairly be deduced from the general acceptance of the term is that the examiner is competent and reliable. How proud we should all be that our good name stands so high, even though so much time has now to be spent in an undignified position at the nether end of a cow.

No! For Heaven's sake leave well alone, remembering that this great testimonial to our professional skill and incorruptibility was gained by sheer merit and value.

Yours faithfully,
A. S. Leese.

White House, Pewley Hill, Guildford.
November 4th, 1944.

The National Farmers' Union see a disparity between stallions and bulls under the licensing system. An unlicensed stallion may stand at stud. They ask the Ministry of Agriculture to investigate this disparity.

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Erratum.—The mis-spelling of the name of Mr. E. J. Simmons in our issue of October 14th is regretted (*V.R.* **56**. 383: Central V.S. discussion—"The Evolution of Small-animal Practice").